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SUMMARY OF RECENT ABSTRACTS*

II. YELLOW FEVER†

Epidemiology: Transmission: Mosquito Control

ELTON (p. 417) has made another contribution to his series of accounts of the wave of epizootic yellow fever which is traversing Central America at a rate of about 13 miles a month. The move is towards the north-west and the threat of urbanization of the virus in the Gulf Settlements of Mexico and the United States is now imminent. Past history suggests that climatic change could originate a sudden increase in the *Aëdes aegypti* population of that area, and unexpected contingencies could arise with a virus as notoriously capricious as that of yellow fever. BOSHELL (p. 1172) states that the epizootic traversed Panama, Costa Rica and Nicaragua, and came to an apparent end half-way through Honduras in 1954. Studies on distribution indicate that though *Haemagogus spegazzinii falco* was a vector in part of the range of the epizootic, it was not present in some areas, and other species, especially *H. equinus*, may be involved. Three genera of monkeys were involved: *Cebus*, *Ateles* and *Alouatta*, and *Cebus* survives infection and may have been an important reservoir. There are several features which are not understood and need study. The chief danger is that the disease might be introduced into towns and be spread there by *Aëdes aegypti*. DE RODANICHE and GALINDO (p. 1310), however, state that the epizootic reached Guatemala in 1956. The virus was recovered (for the first time) from 14 pools of *H. mesodentatus*, 3 pools of *H. equinus* and 4 pools of *Sabethes chloropterus*. Some of the mosquitoes contained recently ingested blood which

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1957, v. 54. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on yellow fever in this series see the February issues of the *Tropical Diseases Bulletin* each year since 1939.

may have been the source of the virus. *H. mesodentatus* seems epidemiologically to be the most important of the 3 species.

Experimental work with monkeys infected with yellow fever virus indicated that *Haemagogus mesodentatus gorgasi*, *H. m. mesodentatus*, *H. equinus* and *Sabethes chloropterus* were capable of transmitting the disease to other monkeys by bite. Galindo *et al.* (p. 674) were also able to recover the virus from the 3 species of *Haemagogus*, and also from *H. lucifer*, but not from *Sabethes*.

In investigations connected with the yellow fever outbreak in monkeys and man in Panama Trapido and Galindo (p. 1070) investigated the possible vectors. The species of *Haemagogus* bite mostly by day, but only 3% were taken at ground level in the tropical rain forest, against 20–33% in the deciduous forest where the canopy is more open. Sylvan yellow fever is transmitted at ground level only when the canopy is broken. Other species, including *Aëdes leucocelaenus clarki* and *Sabethes chloropterus*, showed similar restriction to the canopy in the tropical rain forest, where *S. chloropterus* is particularly abundant and bites freely; it may be important in transmitting the disease in monkeys. In Nicaragua Galindo and Trapido (p. 1071) found *H. equinus*, *H. iridicolor* and *H. spegazzinii falco*, and in laboratory tests all the species of *Haemagogus* were found capable of transmitting the virus. In the more open woodland of the Pacific side the mosquitoes bite more frequently at ground level than those in the tropical rain forest. The role of *S. chloropterus* and *Trichoprosopon magnus* needs investigation.

De Rodaniche (p. 158) examined 10,309 mosquitoes, of various genera and species, captured in Honduras, for the presence of yellow fever virus, but found none, though she isolated an unidentified neurotropic virus from a group of *Psorophora*.

A survey for *Aëdes aegypti* and other species of *Aëdes* is reported by Khurana *et al.* (p. 1070) for the air and sea ports of Bombay. In the airport area control measures are fairly effective, but in the seaport area they need improvement. *Aëdes aegypti* is present in Malaya, and in view of the possible risk of spread if yellow fever was introduced into the country Macdonald (p. 560) has made a study of its distribution and dispersal, noting that it has spread inland from the coastal towns, and that as it continues to spread in the rural areas control becomes progressively more difficult. He also discusses the biology of larvae and adults —up to 50% of breeding places may be out-of-doors but within 10 yards of the nearest house. These papers contain much detailed information.

Northern Australia is a " yellow-fever receptive area ", and where the supply of water is obtained by storing rain-water, *Aëdes aegypti* tends to breed prolifically. O'Gower (p. 24) shows that the installation of a reticulated system of water supply effectively reduces this breeding.

A manual of instruction for eradication of *Aëdes aegypti* has been issued by the Pan American Sanitary Bureau (p. 1405).

Yellow fever was found in Trinidad in 1954, and campaigns for the

eradication of *Aëdes aegypti* with DDT were undertaken. Gilkes *et al.* (p. 159), however, show that evidence of resistance was soon found, and that BHC was much more effective.

Immunization

Mims (p. 1404) shows that infant mice inoculated peripherally with yellow fever virus are much more susceptible than adult mice inoculated in the same way, in that virus could be recovered from liver and blood in the infant but not the adult mice. In the adults virus injected intravenously disappeared from the blood within 10 minutes. He suggests that the difference may lie in the ability of capillary endothelial cells of infant mice to support multiplication of the virus.

Homogeneity of yellow fever virus preparations is essential for immunizing purposes and for evaluation of experimental results; Panthier (p. 947) shows that satisfactory dispersion and improved yields of 17D virus particles were obtained by freezing homogenates of infected chick embryos at −60°C., thawing quickly, and centrifuging. A single-stage lyophilization process gave a product containing less than 0·2% residual moisture. Heterogeneity can be reduced by attention to details of preparation. The same author (p. 561) describes a method of measuring antibodies by means of the yellow fever mouse protection test; details should be sought in the original.

Meers (p. 1311) sums up various investigations on the value of 17D vaccine administered by scarification, and finds that whether it was used as direct chick-embryo vaccine or as mouse-brain vaccine obtained by inoculating mice with the chick-embryo vaccine, 85 ± 5% of persons were solidly protected. The mouse-brain vaccine was as safe as the chick-embryo vaccine, and neither the number of insertions nor the dosage (1,000 to 80,000 LD50) had any influence on the final figures. At Yaba (Nigeria) 1 cross-hatch scratch through each of 2 drops of vaccine with a titre of not less than 2,000 LD50 per dose is the usual practice. Boiron (p. 1175) has been able to demonstrate that a second dose of vaccine will raise the level of antibody in persons previously vaccinated, whether their existing level is low or high. The virus, when inoculated into an immune person, is rapidly neutralized, but however brief its passage it is still capable of stimulating the defence mechanism.

Panthier (p. 159) reports several cases of encephalitis in young babies after inoculation of the 17D yellow fever vaccine. He urges that infants under 1 year of age should not be given yellow fever vaccine, and he stresses the importance of strict attention to technical detail in preparing the vaccine—one batch in this series had been prepared in an emergency from an inoculum removed by a few passes from the "seed". An official centre for preparation and distribution of "seed" vaccine should be established. Panthier and Husson (p. 1173) discuss allergic reactions after immunization against yellow fever. At the Pasteur Institute, Paris, persons with a history of allergic disease are tested intradermally with

17D vaccine, and if this gives a strongly positive result immunization is delayed for a month and is then performed by scarification with Dakar vaccine. Although some protection is given by the intradermal test, the titre is greatly increased by the later scarification. If a weak reaction is produced by the test a reduced dose (0·4 ml.) of 17D is given subcutaneously, and if the test is negative the full dose is given. A severe allergic reaction after immunization with 17D vaccine is reported by Becker and Lieske (p. 948), who attribute it probably to the chick embryo protein in a sensitized person. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Kraan, H. Geïmporteerde malaria. [**Imported Malaria**] *Nederl. Tijdschr. v. Geneesk.* 1957, Nov. 2, v. 101, No. 44, 2064–6, 2 figs.

The English summary appended to the paper is as follows:—

"The author gives the figures of indigenous cases of malaria in the Netherlands and of those among repatriated people from endemic areas in recent years. Among these immigrants are many parasite carriers of *Plasmodium vivax* and *P. malariae* who cause a number of indigenous cases of malaria by infection with parasite strains of foreign origin. He describes the control measures in the province of North-Holland." [See this *Bulletin*, 1958, v. 55, 4.]

Janicki, M., Dymowska, Zofia & Łukasiak, J. Zimnica w Polsce w latach 1945–1955 ze szczególnym uwzględnieniem jej przebiegu w Warszawie. [**Malaria in Poland in the Period 1945–1955 with Particular Reference to its Development in Warsaw**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 109–21, 3 figs. [33 refs.] English summary.

Since 1940 the incidence of malaria in Poland has increased greatly, and in 1948 1,812 cases were recorded in Warsaw and 9,941 in the whole of Poland, representing incidences of 33·4 and 4·1 per 10,000 respectively. The incidence then fell to 14 and 80 cases respectively in 1955. In Warsaw most cases occurred in the outlying parts of the city, particularly in the north by the River Vistula, where flooded trenches dug during the war afforded breeding places for mosquitoes, including *Anopheles maculipennis messeae, A. m. typicus* and *A. bifurcatus* [*claviger*]. Most cases occurred between weeks 19 and 28 in 1946–47 and between weeks 28 and 30 in 1948–49. In the following years the number of cases fell sharply,

presumably on account of the lower mean temperatures and the institution of antimalarial measures.

It is suggested that the first cases in the year are due to *Plasmodium vivax hibernans* (subsp. nov. Nikołajew 1949), with a long incubation period, which is the main cause of malaria in Poland, whereas the later cases are due to *P. vivax vivax*, with a short incubation period, and occur mainly in epidemic years when there is a high mean summer temperature.

D. J. Bauer

Matson, A. T. **The History of Malaria in Nandi.** *East African Med. J.* 1957, Aug., v. 34, No. 8, 431–41, 1 map.

So far as can be ascertained malaria, and possibly mosquitoes also, were absent from the Nandi district of Kenya until after the 1914–18 war. Early explorers and others remarked on the freedom from disease, and praised the healthy climate of this plateau. The author traces the history of the Nandi people who came from Elgon and settled in the Nyanza area where the surrounding forests and plains were probably uninhabited until Bantu and Luo migrations took place subsequently. Later, during the period of British occupation, Nandi raiding forays were being conducted over a very wide area and in many districts now very malarious so that they were in contact with the infection. It is inferred that malaria vectors must have been absent from their home environment, or if present did not become infective, because the disease, though probably imported, does not appear to have become endemic. The theory is advanced that as a result of development of the country by the British, particularly the road to Uganda and the building of the railway to Kisumu, large numbers of people, many of whom harboured malaria parasites, worked in or passed through the region and introduced mosquitoes from the east. The Nandi kept away from the railway zone and did not readily submit to British rule and so continued to escape malaria. Cutting of the forest on their plateau probably altered the rainy, cold climate and facilitated mosquito introduction. *Anopheles gambiae* and *A. funestus* became acclimatized to the Nandi altitudes, and when the Nandi soldiers returned after the 1914–18 war, in which they had taken an enthusiastic part, they formed a large reservoir of infection and an epidemic resulted which recurs annually and has required the introduction of control measures.

T. H. Davey

Senecal, J. & Larivière, M. Fréquence des différentes formes de Plasmodiums rencontrées chez les enfants Africains à Dakar. [**Incidence of Different Forms of *Plasmodium* seen in African Children in Dakar**] *Bull. Méd. de l'A.O.F.* Dakar. 1957, v. 2, No. 2, 248–51.

The English summary appended to the paper is as follows:—

"If *Plasmodium falciparum* is the most frequent in Senegal, nevertheless, *Plasmodium malariae*, especially among children, should not be

neglected. *Plasmodium vivax*, on the other hand, is very rare and in the two observed cases, seems not to have been caught in Senegal."

HEDEEN, R. A. **A Note on the Occurrence of *Anopheles algeriensis* Theobald in Western France.** *Mosquito News.* 1957, June, v. 17, No. 2, 97–8.

Anopheles algeriensis is generally regarded as a Mediterranean species. It has been reported sporadically in Central European countries and in some areas bordering on the Mediterranean, but the author has found no record of its occurrence within the geographical borders of France.

He now reports two findings in Western France made in 1955 and 1956 by members of the U.S. Army Medical Service. The first consisted of a collection, in March 1955, of 4 larvae from a semi-permanent pool containing dense vegetation near La Rochelle (Charente Maritime). The second was made in April 1956 from a heterogeneous collection of adult mosquitoes reared from several collections of larvae from the vicinity of St. Nazaire (Loire Inferieure). 16 of these adults were identified as *A. algeriensis*. Although their exact origin could not be determined in the circumstances, it would seem that they came from the margins of a slightly brackish slow-moving stream.

The author refers briefly to previous observations on this species and, since it seems to be distributed more widely than was formerly thought, suggests that it might be of more importance as a potential vector of malaria than has hitherto been believed. *H. J. O'D. Burke-Gaffney*

RIVOLA, E. & HOLSTEIN, M. H. Note sur une variété d'*Anopheles nili* Theo. [**A Variety of *Anopheles nili***] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 382–87, 2 figs. [11 refs.]

The new form is described and named *Anopheles nili* var. *somalicus*. It was recovered in Somalia.

EYSSERIC, G., BENAZET, F. & SOHIER, R. Les séro-réactions de Henry chez les Européens rapatriés de zone d'endémie palustre. (Confrontation avec les tests dits de labilité plasmatique.) [**The Henry Serum Reaction in European Repatriates from Regions with Endemic Malaria. Comparison with Tests said to indicate a Plasma Lability**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 462–73. [11 refs.]

A very detailed comparison has been made of the results of Henry's test for evidence of malarial infection and of general tests known to be positive when the lability of serum proteins is altered. Most of the

tests are devised by French authors and are not as well known in British laboratories as they probably deserve. However, one of the control tests is the widely used thymol turbidity and thymol flocculation test of MacLagan. The authors investigated 227 malarial sera and 48 from patients with other diseases. Though Henry's reaction is not always positive in malaria, it seems to be more specific for the diagnosis of that infection than other tests for protein lability which have largely been devised as liver function tests. *H. Lehmann*

Floch, H. Importation du paludisme et traitement imposé à l'entrée des immigrants. [**Imported Malaria and the Treatment of Immigrants on Entry**] *Bull. Soc. Path. Exot.* 1957, Mar.–Apr., v. 50, No. 2, 212–17. [11 refs.]

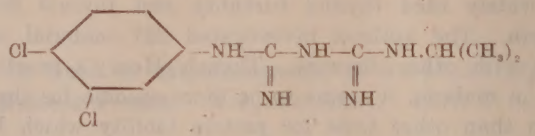
[See this *Bulletin*, 1957, v. 54, 130.]

Davey, D. G.; Robertson, G. I. **Experiments with Antimalarial Drugs in Man. II. A Description of Methods** [Davey & Robertson]. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, Sept., v. 51, No. 5, 450–56. [11 refs.] **III. Experiments with Compound 5943** [Robertson]. *Ibid.*, 457–62. **IV. An Experiment to investigate the Prophylactic Value of Proguanil against a Strain of *Plasmodium falciparum* known to be Resistant to Therapeutic Treatment** [Davey & Robertson]. *Ibid.*, 463–6. [14 refs.]

II. The authors described [this *Bulletin*, 1953, v. 50, 1120] experiments in which complete causal prophylaxis against an African strain of *P. falciparum* was obtained by varying doses of proguanil. The present paper describes further tests with other drugs on non-immune European and non- or partly-immune African volunteers. The *Anopheles gambiae* vectors used showed very different infectivity rates, owing it was thought to the variation in gametocyte rates in the donor's blood. When volunteers were infected ample precautions were taken to ensure that the number of sporozoites injected was adequate. 5 strains of *P. falciparum* were used, 3 African and 2 Malayan. *A. gambiae* from Kenya appeared able to transmit all equally well.

It appeared that all volunteers gave the same response to infection whatever its geographical origin. While the drug under test was being taken some volunteers were exposed to many infective bites, more than would occur in nature. In other cases exposure to infection occurred on one occasion only. The interesting observation was made that parasites were most susceptible to drugs of the proguanil type 48 hours after infection. The methods used and the reasons for employing them are given in some detail and should be read in the original. Some observations on the difficulties encountered in infecting *A. gambiae* are of interest.

III. Compound 5943 has one more Cl atom than proguanil in the benzene ring as shown in the accompanying formula



With the methods described above, 6 African volunteers were exposed to infective mosquito bites almost daily for 1 month. 20 mgm. of substance 5943 were given on the first day of exposure and thereafter at weekly intervals on 5 occasions, the last being on the 29th day following infection. No parasites were seen for 63 days thereafter but the recipients were not immune to reinfection. The test was repeated with doses of 10 mgm., with similar results except that 1 of 6 volunteers became infected. The prophylactic power of the drug was thus demonstrated. Besides providing much further information a table of results indicates that a weekly dose of 20 mgm. 5943 would provide adequate causal prophylaxis, but for safety one further dose should be taken on leaving a malarious area. No pre-medication should, however, be required before entering a malarious area. When doses of 30 mgm. for adults and 10 mgm. for the young were used in treatment of acute attacks of *P. falciparum* malaria clearance of parasites from blood and disappearance of pyrexia resulted within 2 to 4 days. Increase in parasitaemia frequently occurred 2–3 weeks later. Doses of 50 mgm. 5943 once weekly for 9 weeks followed by twice weekly doses for 5 weeks caused no untoward symptoms. Like proguanil 5943 prevents oöcyst development in the mosquito stomach. Weight for weight the drug is more active and persistent than proguanil, and a dose of 15 mgm. weekly is in general regarded as adequate for protection against *P. falciparum*.

IV. Various species of malaria parasites have been shown to become resistant to proguanil [this *Bulletin*, 1947, v. 44, 969, 970; 1948, v. 45, 1066; 1949, v. 46, 219, 609]. In the case of *P. gallinaccum* it was shown that resistance of blood forms to proguanil also extended to exo-erythrocytic forms. Resistance of human parasites to the drug was noted in Malaya where patients with *P. falciparum* and *P. vivax* infections had been treated irregularly [*ibid.*, 1950, v. 47, 437]. During that time no failures of the drug as a prophylactic was observed. A proguanil-resistant strain of *P. falciparum* from Malaya was injected into patients requiring fever therapy in Nairobi. *Anopheles gambiae* were subsequently infected with this strain and used to infect 10 European volunteers who had never suffered from malaria. They were exposed to infection daily for 28 days and received 100 mgm. proguanil on the day of infection and daily for another 41 successive days. Observation continued thereafter for 6 weeks longer. All untreated controls became infected. 4 of the 10 treated subjects also became infected. The indications are that now—10 years after its first introduction to Malaya—proguanil is still effective as a

prophylactic. The control to a large extent of the resistant strain of *P. falciparum* by prophylactic doses under stringent conditions is not easy to explain but gives cause for satisfaction. *J. D. Fulton*

WILSON, D. Bagster. **Construction, Irrigation and Malaria.** *East African Med. J.* 1957, Sept., v. 34, No. 9, 479–85.

The importance of the correlation between malaria and engineering construction still needs to be emphasized. This article discusses the subject with special reference to East Africa, and urges that attention should be paid to malaria prevention from the planning stage onwards. There are no rules applicable to all cases, and adaptability is needed. In reference to water impoundment and irrigation, the author deals with drainage, intermittency of flow and preliminary survey of the soil. Dams should be built with steep sides, should be situated at least a mile from aggregations of houses, the edges should be cleared and protected, and drainage at the foot of the dam wall should be provided.

Roads and railways often interfere with the run-off of rainwater and this must be corrected by provision of adequate and suitable culverts and the use of inverts on natural drainage channels. Borrow-pits should be kept shallow or made into drains. General constructional developments necessitate consideration of factors such as site, subsoil water level, and natural drainage. Consultation between engineers and health advisers is essential at all stages. Only by attention to environmental sanitation will the engineer's contribution to human welfare be a positive one.

T. H. Davey

HOLLINS, F. R. **The Atoll of Ontong Java, its Depopulation and Malaria Control.** *J. Trop. Med. & Hyg.* 1957, Oct., v. 60, No. 10, 231–7, 1 map & 1 plan. [10 refs.]

Ontong Java is an atoll of some forty small islands and reefs in the British Solomon Islands, peopled by two distinct tribes of Polynesian origin. It was sighted by some of the early explorers, but the first Europeans to visit it were whalers and traders in the 1870's; trading stations were established in the 1880's. Between 1860 and 1880 famines are believed to have caused many deaths but in 1907 the population was reliably estimated at 5,500. In 1921 a careful census revealed that the population had shrunk to 1,016; there has been no recovery and the figure in 1954 was 768. There are no records, but the disaster is attributed to the introduction of respiratory diseases and malaria, which formerly was not endemic but was found to be hyperendemic when a survey was done in 1951. In 1938 the atoll was closed to inter-island shipping, to prevent further introduction of respiratory disease.

In the last two years a mosquito eradication campaign has been carried

out by mobilizing the entire population into three forces, one doing anti-malarial work, the other two engaged in keeping up the food supply. Although *Anopheles farauti*, the malaria vector, was the true object of the campaign, nuisance mosquitoes also were attacked as a matter of policy. Apart from residual spraying, swamps, coconut shells and tree holes were attended to. *Gambusia* fish, which thrive, were introduced into pits dug for the purpose in many swamps. *A. farauti* and malaria have been practically eliminated; it is as yet too early to see demographic results, but there has been a notable effect on the morale of the islanders.

B. B. Waddy

MACDONALD, G. **The Epidemiology and Control of Malaria.**

This book is reviewed on p. 229.

WOODRUFF, A. W. **Serum Protein Changes induced by** *Plasmodium berghei* **Infection in Rats and** *Plasmodium knowlesi* **Infection in Monkeys.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, Sept., v. 51, No. 5, 419–24.

It was previously found by the author [this *Bulletin*, 1955, v. 52, 818], using electrophoretic methods, that marked increase in the gamma globulin fraction of serum occurred in African patients suffering from nutritional anaemia accompanied by liver damage. Because of the prevalence of malaria in the districts concerned the question of the effect of this disease had also to be considered. Comparative studies were made on the serum of rats infected with *P. berghei* and of rhesus monkeys infected with *P. knowlesi*. While it has been accepted that an increase of globulin occurs in malaria, there is some doubt about the fraction affected.

Blood was obtained from the tail of infected rats before and at weekly intervals after infection with *P. berghei*, and counts of parasites and red cells were made. The serum was examined electrophoretically at intervals up to 7 months after initial infection. Comparable experiments were made on uninfected and on chronically infected rhesus monkeys. In infected rats an increase in the gamma globulin fraction of serum occurred after 6 or 7 months and a further increase occurred after reinfection. In monkeys the increase in gamma globulin of serum was small and not significant over a period of 10 weeks after initial infection. In chronically infected animals also the increase was only small. The author considers that malarial infection stimulates gamma globulin production partly through formation of antibodies, since it is enhanced by reinfection. Similar effects from malaria probably arise in man. *J. D. Fulton*

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:— epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

HUGHES, J. C. **Olfactory Stimulation of Tsetse Flies and Blowflies.** *Bull. Entom. Res.* 1957, Sept., v. 48, Pt. 3, 561–79, 5 figs. [25 refs.]

Several organic compounds were tested as olfactory stimulants in two species of tsetse fly, *Glossina palpalis* and *G. morsitans* and in the blowfly *Phormia terraenovae*. These organic compounds fell into three groups: (1) liquid, monocarboxylic acids and amines present in decaying animal sweat and excreta; (2) a selection of liquid aliphatic straight chain mono-alcohols, ethyl esters and acetates known to be repellent to other blood-sucking diptera; (3) a selection of hydrocarbons with more than one functional group including hydroxy and unsaturated acids and esters, chlorinated esters and glycols.

The activity of the insects was measured by exposing them to known concentrations of the vapour of the chemical and also in a choice-chamber type of apparatus. This last piece of apparatus gave a measure of the attractiveness or repellency of the vapour being tested. The responses of the insects to the vapours were cleaning of the antennae and probing movements of the mouthparts followed by intermittent flight. The degree of activity was measured by the time spent in flight.

In some preliminary experiments with four carboxylic acids present in animal sweat, it was found that the activity of *G. palpalis* and *G. morsitans* varied linearly with the concentration of the vapour. It was also found that the activity of these flies rose to an initial peak during the first few minutes and then fell off to a constant level. Both species reacted by probing in the acid vapours, but their level of activity was unaffected by variations in the light intensity, relative humidity or population density. The experiments with the choice-chamber apparatus were not wholly successful and were eventually discontinued.

In the main experiments the first type of apparatus was used. The standard molar concentration, defined as the concentration of vapour required to raise the activity of the flies to a standard level of 10 times that in pure air, and the threshold concentration (the maximum concentration of vapour that would not raise the activity of the flies) were calculated for each compound. Tables are included which give these values for all the substances tested.

This is followed by a multiple regression analysis which was used to relate the standard molar concentration to 5 physical properties of the compounds, namely vapour pressure, water solubility, molecular volume,

dipole moment and dielectric constant. The results suggest that a compound having low vapour pressure, low dielectric constant and high dipole moment is likely to be a good olfactory stimulant. A possible physiological mechanism for olfactory stimulation is discussed and a possible method of using olfactory stimulants to increase the efficiency of sprayed insecticides against tsetse flies. *D. S. Saunders*

HUGHES, J. C. **Olfactory Stimulation of *Glossina palpalis* (R.-D.) by Combustion Products from Petrol Engines.** *Bull. Entom. Res.* 1957, Sept., v. 48, Pt. 3, 581–3.

A sample of sump oil was broken up into several fractions of different boiling ranges by various methods of distillation. Each fraction was tested in different concentrations of vapour upon the activity of *Glossina palpalis*.

Results show that the activity of the flies varies linearly with the concentration of the vapour. The "threshold concentration" and the "standard concentration" (the concentration of vapour required to raise fly activity to 10 seconds of flight per fly during 5 minutes) were also calculated for each fraction. These concentrations decreased as the boiling points of the fractions increased. There was no increase in activity in flies exposed to exhaust gas.

[See also this *Bulletin*, 1938, v. 35, 337.] *D. S. Saunders*

ISHERWOOD, F. **The Resting Sites of *Glossina swynnertoni* Aust. in the Wet Season.** *Bull. Entom. Res.* 1957, Sept., v. 48, Pt. 3, 601–6. 1 text fig. & 4 figs. on pl. [15 refs.]

Samples of populations of *Glossina swynnertoni* obtained on fly rounds always contain a very low percentage of female flies, which are generally hungry. As the true percentage of female flies should be at least 50%, it is obvious that this result is not a representative sample of the population and a large number of flies must be in the resting condition. This paper deals with the search for the resting sites of *G. swynnertoni* during the short wet season of 1956, near the Mwakilendya River, Shinyanga.

The most common resting site was found to be underneath the branches of small trees, especially *Lannea humulis*, with some flies on *Commiphora*, *Dalbergia* and *Acacia*. The percentage of females in these resting flies was much higher and a smaller number of them were hungry. This knowledge of the resting sites may well be useful in anti-tsetse measures with residual insecticides. *D. S. Saunders*

Van Bogaert, L. & Janssen, P. Contribution à l'étude de la neurologie et neuropathologie de la trypanosomiase humaine. [**Neurological and Neuropathological Observations in Human Trypanosomiasis**] *Ann. Soc. Belge de Méd. Trop.* 1957, June 30, v. 37, No. 3, 379–426, 36 figs. on 22 pls. [Numerous refs.]

This lengthy and interesting paper from the Neuropathological Laboratory of the Bunge Institute (Ruanda-Urundi) should be consulted in the original by those interested in the lesions of the central nervous system which occur in human trypanosomiasis due to *Trypanosoma gambiense*. The authors, with numerous references to the extensive relevant literature, record their own detailed work on the subject and illustrate it with many good photographs and photomicrographs. They classify, with appropriate case notes, the clinico-anatomical forms of neurological involvement in trypanosomiasis as follows: those in which mental changes predominate; the extrapyramidal; the ataxic and ataxo-cerebellar; and the radiculo-neuritic types. They show, for the first time, the diffusion of the lesions at the neuro-ganglionic stage; they also describe a subacute and fatal form of ascending polyradiculoneuritis. Some of their cases presented this latter feature, which hitherto they have not seen described and they remark that the literature on lesions of the peripheral nervous system in trypanosomiasis is singularly meagre if not entirely non-existent. The neuritis of African sleeping sickness is characterized by cellular infiltrations, which are especially abundant around the vessels. The site of predilection is at the level of the dorsal roots both proximal and distal to the spinal ganglions, or where the nerve bundles enter and leave the ganglion. It differs from other forms of neuritis in the marked panvasculitis and by the presence of Mott cells.

There is an account of the morphological changes seen in lesions of the optical intercerebral tracts. The authors conclude that the axial involvement in central nervous system trypanosomal disease is at least as important as the classical cortical involvement and that trypanosomiasis belongs to the group of leuco-encephalitides. There remains to be discovered a technique of animal infection which will result in the development of neuro-pathological changes comparable with those observed in man, and thereby may be developed effective chemotherapy to the best advantage. *A. R. D. Adams*

Burke, J. Contribution à l'étude de la valeur thérapeutique de l'Arsobal dans la trypanosomiase (à *Trypanosoma gambiense*). [**A Contribution to the Study of the Therapeutic Value of Arsobal in Trypanosomiasis** (*Trypanosoma gambiense*)] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30, v. 37, No. 2, 175–90. [26 refs.]

These studies were made under FOREAMI at Kwango, in the Territory of Banningville lying between the Kasai and Kwango rivers in the Belgian

Congo. The intensity of endemic trypanosomiasis there in 1933 was 2%, with foci of 10 to 15%; by various means the broad incidence has now been reduced to 0·05%. Wholesale chemoprophylaxis, since 1945, in addition to reducing the frequence has had its influence on both the diagnosis and the treatment of the disease as now seen. Diagnosis by finding the parasite is less usual, and the proportion of cases disclosed clinically through central nervous system involvement is greater. Furthermore, the progress of the disease is more rapid; neurotropism of the parasite is noticeably earlier and more marked, for instance after pentamidine chemoprophylaxis. The author presents figures which clearly show this; for example, in 1950 the percentage of newly diagnosed cases with trypanosomes in the cerebrospinal fluid was 8·3 whereas in 1954 the figure was 40·0, and 79·5% of all newly diagnosed cases had significantly altered cerebrospinal fluids [CSF]. In 1951 for 1 case diagnosed solely on clinical ground a parasitic diagnosis was made in 12·4; in 1954 the corresponding figure was only 1·25. Tryparsamide treatment frequently proved ineffective; tryparsamide given with pentamidine was more satisfactory, especially in previously untreated cases; but of 31 (16 new and 15 old, previously treated) patients so treated only 4 (13%) could be considered cured of their infections, and of the remaining 87%, 7 (22·5%) so far have died. This treatment when unsuccessful appeared in these cases, after temporary relief, to increase the nervous involvement of the disease.

With appreciation of its reputed dangers it was decided to give Arsobal to tryparsamide-resistant cases of trypanosomiasis with meningo-encephalitis, and also to newly diagnosed patients with advanced disease. The results were so encouraging and the toxicity of the drug in fact proved so slight that its use was extended to early cases with meningeal involvement. The author now thinks that this was a mistake, and that Arsobal at this early stage has no advantage over tryparsamide. The preparation used was 3854 RP (Arsobal) or Freidheim's Mel B, a 3·6% solution of melaminyl-4-phenylarsino-dithioglycerin in 50 cc. phials. Two schemes of dosage were employed; the original was later abandoned and replaced by the second. The details are set out in a table. From this it emerges that patients are divided into 2 classes—the previously untreated and those already unsuccessfully treated. In each division there is a further subdivision into those with a normal protein content of the CSF and those with an abnormal protein content; and each category is again further subdivided according to the cell content of the CSF. The dosage was lowest in those with a normal protein content and a normal cell count; the original treatment given such cases was a single injection of 4 mgm./kgm. of Arsobal; later this was modified to the same initial dose or 3 injections of 3·6 mgm./kgm. on successive days; and this was used in all such cases with less than 100 cells/cmm. Where the cell count exceeded 100 cells/cmm. the course was repeated, with an interval of 2 weeks. For the old, already treated, cases the latest treatment used

is much the same, but it is given on 2, 3, or 4 occasions at 2-week intervals as the degree of change in the CSF indicates. The gross amounts of drug given under the latest regimen therefore range from a minimum of 4·0 mgm./kgm. to a maximum of 43·2 mgm./kgm. as circumstances indicate.

26 newly diagnosed, previously untreated, patients were treated with Arsobal; 17 had slight or moderate alterations of the CSF and 9 had gross changes in the CSF: 9 of the former and 8 of the latter were deemed cured. 57 old cases were treated; of these 36 were considered (after 17 months' observation) cured, and 15 had improvements in the CSF suggesting cure; 1 died. In summary 89·5% of all cases appeared effectively to have been treated, and in only 10·5% was the treatment unsuccessful.

Only 1 fatality resulted from the treatment. This patient was allowed out of hospital during a 2-week interval after a first course of injections. This course was 3 injections of 126 mgm. of Arsobal. He was returned 48 hours later in coma with fever, and died the same day in spite of BAL treatment. The author thinks that if he had not been allowed to leave the hospital he would not have died. Another patient suffered a generalized erythroderma with fever and signs of intoxication; energetic BAL treatment relieved these. Yet another had a papular rash, without fever or other signs; calcium gluconate injections and an anthistaminic orally cleared this. Persisting albuminuria demanded the cessation of treatment in another patient. The immediate mortality attributable to the drug was thus 1·7%; the total mortality was 3·4%.

The assessment of the degree of trypanosomal involvement, and of the control of the disease by treatment, is made by repeated examinations of the CSF at appropriate intervals over at least 2 years.

The author concludes that Arsobal should be used in newly diagnosed cases only where there are advanced meningeal or meningo-encephalitic changes. It is advisable after an initial course of treatment with it to give a further supplementary course of treatment. Old-standing cases of the disease with parasites which have become arsenic-resistant in particular benefit from Arsobal treatment; in these cases several courses of treatment should be given. The drug has successfully been used for children aged 5 to 10 years, and for pregnant women. The Arsobal treatment should be restricted to hospitals. *A. R. D. Adams*

Evens, F., Niemegeers, K. & Packchanian, A. **Chemotherapy of *Trypanosoma gambiense* and *Trypanosoma rhodesiense* Infections in Guinea Pigs with Nitrofurazone.** *Amer. J. Trop. Med. & Hyg.* 1957, July, v. 6, No. 4, 658–64.

Nitrofurazone (Furazin) (5-nitro-2-furaldehyde semicarbazone) was shown by Packchanian [this *Bulletin*, 1956, v. 53, 31] to cure *Trypanosoma gambiense* and *T. rhodesiense* infections in mice. The compound

is only slightly soluble in water but is very stable. The tolerated dose for guineapigs is 20 mgm./kgm. of a water suspension, when given intraperitoneally daily over 17 days.

11 strains of *T. gambiense* isolated from patients in the Belgian Congo during the last 5 years have been maintained in guineapigs; these when thus infected survive about 150 days. 7 strains of *T. rhodesiense* obtained during an epidemic in Ruanda-Urundi were similarly maintained; infected guineapigs survive about 50 days.

32 guineapigs were infected with one or other of the strains of *T. gambiense* and treated with a single dose of nitrofurazone given intramuscularly. The dose used was between 50 and 150 mgm./kgm. Usually it was given about 30 days after infection, when parasites were numerous in the peripheral blood. In a few instances treatment was delayed until 100 to 200 days after infection. The blood was examined daily after treatment. Treatment was deemed "ineffective" when trypanosomes continued in the blood after dosage; "suppressive" when they vanished within 24 hours, but later recurred (usually after 3 to 5 weeks); and "curative" when parasites completely vanished and the animal remained well for 200 to 369 days. Of the 32 guineapigs infected with *T. gambiense* strains 16 were cured; the treatment was suppressive in the remainder. There were marked differences in the response of the various strains to a given dose of the drug. The response was better when treatment was given early than when it was delayed for 2 to 5 months after infection.

30 guineapigs infected with one or other of the 7 strains of *T. rhodesiense* were similarly treated, again usually about the 30th day and at latest the 63rd day. In these treatment was "ineffective" in 3 instances; "suppressive" in 24; and "curative" in only 3 instances. Where the infection was merely suppressed the parasites usually reappeared in the peripheral blood within 5 to 26 days; in 2 instances the relapses occurred after 67 and 89 days respectively. The relevant data are clearly set out in a number of tables.

Nitrofurazone, therefore, though it seems to yield significantly satisfactory results in the treatment of *T. gambiense* infections in guineapigs, did not prove so satisfactory for *T. rhodesiense* infections in these animals.

A. R. D. Adams

Evens, F., Niemegeers, K. & Packchanian, A. **Nitrofurazone Therapy of *Trypanosoma gambiense* Sleeping Sickness in Man.** *Amer. J. Trop. Med. & Hyg.* 1957, July, v. 6, No. 4, 665–78. 2 diagrams.

Many cases of human African trypanosomiasis relapse after treatment with any of the accepted therapeutic trypanocidal drugs; the outlook then becomes very poor and the mortality high. The need for more potent trypanocidal drugs is thus clear. This is a record of the first trial of nitrofurazone in the treatment of human African trypanosomiasis. 32 African patients in the south-western Belgian Congo, in various stages

of *Trypanosoma gambiense* trypanosomiasis, were treated with nitrofurazone. The patients were classified into 5 groups, according to the stage of the disease and the history of antecedent trypanocidal treatment. Those in group I (3 patients) were early-stage previously-untreated adults. Group II (3 patients) was comprised of untreated children with central nervous system involvement, from whom parasites were recovered from the blood, glands and cerebrospinal fluid (CSF). Group III (9 patients) contained chronic relapsing cases refractory to intensive and prolonged treatment with the usual trypanocidal drugs (including the melaminyl compounds and puromycin). Group IV (3 patients from group III) included cases which had relapsed after similar treatments, but including nitrofurazone. Group V (17 patients) consisted of refractory cases treated over years with many drugs (not including nitrofurazone) and suffering grave advanced central nervous system involvement.

Nitrofurazone (Furacin) (5 nitro-2-furaldehyde semicarbazone) was given orally in tablets of 100, 200, or 250 mgm. The selected dosage was given in 2, 3, or 4 divided doses daily. The Group I patients were given this drug alone, the dose being 8·8 to 30 mgm./kgm. daily for 7 to 13 days. All 3 patients markedly benefited from the treatment, and parasites, previously readily found, could no longer be recovered; this state continued for the 4 and 10 months respectively that 2 of the 3 patients remained under supervision.

Group III patients were similarly treated for 11 to 29 days.

The Group II patients were similarly given nitrofurazone for 6 to 8 days and also lomidine [pentamidine] (4·0 mgm./kgm. daily or on alternate days for 6 days) concurrently.

Group IV and Group V (the "hopeless") patients were treated with nitrofurazone and 3 other trypanocidal drugs (lomidine, Bayer 205 [suramin], and Arsobal) in combination over 2 weeks; this treatment was immediately followed by a second similar course; in some cases a third was given after a week's interval; and in a few cases this was again immediately succeeded by a fourth course. This the authors descriptively call the "cocktail treatment".

The data relative to these various patients and the treatments they were given are clearly set out in a number of tables and detailed case notes, which should be examined in the original by those concerned. The conclusions drawn from them by the authors are that nitrofurazone, given orally, is effective against trypanosomes both in peripheral blood and in the CSF of man. It passes the blood-brain barrier. The distribution of the drug in the blood is 2/3 in the cells and 1/3 in the plasma. The peak concentration in the blood after an oral dose is reached in 8 hours and it falls considerably after 24 hours; 1·0 gm. given orally to a dog produced within 2 hours a serum concentration of 0·75 mgm.% and a CSF concentration of 0·22 mgm.%. The drug in doses of 2·1 to 12·5 mgm./kgm. when given to man thrice daily for 7 to 36 days is usually well tolerated; there may be temporary nausea and vomiting; sometimes

muscle and joint pains in the legs develop and persist for up to a month. 2 of 3 adults without central nervous system involvement were cured by nitrofurazone given alone; 2 of 3 children with serious central nervous system involvement were cured with nitrofurazone when given together with pentamidine. Nitrofurazone should not be given alone in refractory cases, but should be given in conjunction with other trypanocides. A "cocktail" treatment consisting of suramin, pentamidine, and Arsobal, in conjunction with nitrofurazone produced amelioration in 9 of 20 "hopeless" relapsing cases previously refractory to all other treatments. This combination of drugs proved no more toxic to the patient than did the individual drugs given alone. *A. R. D. Adams*

Cantrell, W. **Duration of Acquired Immunity to *Trypanosoma equiperdum* in the Rat.** *J. Infect. Dis.* 1957, Sept.–Oct., v. 101, No. 2, 175–80.

Forgacs, Elisabeth, Schenone, H. & Niedmann, G. Encuesta sobre enfermedad de Chagas en el pueblo minero de Inca de Oro. [**A Chagas's Disease Survey in the Mining Town of Inca de Oro**] *Bol. Chileno de Parasit.* 1957, July–Sept., v. 12, No. 3, 51–2.

The English summary appended to the paper is as follows:—

"A Chagas' disease survey in Inca de Oro [Chile] has shown that 33 of 857 residents examined have positive xenodiagnosis. *T. cruzi* infection was also detected in 34 of 151 domestic mammals examined."

Náquira, F. & Náquira, N. Contribución al estudio de la enfermedad de Chagas. II. Nuevas investigaciones epidemiológicas en el Sur del Perú. [**Contribution to the Study of Chagas's Disease. II. Further Epidemiological Surveys in Southern Perú**] *Bol. Chileno de Parasit.* 1957, July–Sept., v. 12, No. 3, 46–50. [16 refs.]

The English summary appended to the paper is as follows:—

"1.—Xenodiagnosis performed on 512 residents of various southern Peru localities was positive in 19 cases.

"2.—82 of 284 individuals had positive Machado-Guerreiro's test.

"3.—Only one domestic mammal of 20 examined was found to be a natural reservoir of infection with *T. cruzi* for man.

"4.—221 *Triatoma infestans* specimens were captured, 70 being naturally infected with *T. cruzi*.

"5.—Kahn's test was positive in 3 of 281 persons."

de Lucena, D. T. & Costa, L. Inquérito sorologico sôbre a doença de Chagas na Paraíba. [**Serological Survey of Chagas's Disease in Paraíba, Brazil**] *Rev. Brasileira Med.* Rio de Janeiro. 1957, May, v. 14, No. 5, 323–7.

The English summary appended to the paper is as follows:—

"A serological survey on Chagas' Disease carried in the State of Paraiba, Brazil, using Guerreiro-Machado complement fixation test, was performed. Antigen used was prepared by Julio Muniz whose technic was followed to make the reactions.

"A total of 3,804 blood samples were collected in 19 counties in small villages, farms, sugar plantations, etc., of the main physiographical zones of the State. From those samples, 206 were unsuitable or lost, that is, there remained 3,598 samples that gave the following results:

Negative	2,858—79·43%
Positive + to ± + + + ...	740—20·57%
Positive + + to / + + + + ...	719—19·98%
Positive + + + to / + + + + ...	584—16·23%

"As indicative of Chagas' Disease infection those reactions with results varying from a partial hemolysis (+ +) to a complete absence of hemolysis (+ + + +) were considered, which means an index of infection of 19·98%. Positive reactions ± were considered questionable, thence discarded for statistics purpose.

"More than 1,000 blood samples were obtained in each of the three main physiographical zones of the State: Mata, Agreste and Sertão, in which the results were respectively the following: 19·54%—17·99%—23·14%. This slightly higher index in Sertão implies recognition of its importance, generally admitted, in the nosographic chart of the State. In fact, it agrees with a previous entomological survey made in the whole State, which revealed a higher index of infected Triatomids in the Sertão zone (Lucena & Costa, 1954) [this *Bulletin*, 1956, v. 53, 162].

"All the age groups considered were found infected. It must be emphasized that even the group 0–10 years showed a percentage of infection of 11·54%; thence the curve ascends gradually to a peak in the group 31–40 years (28·14%), from where it descends slowly to be represented in the last age group (× 60 years) by the percentage of 21·43.

"As a conclusion, Chagas' Disease is considered to be highly endemic in the State of Paraiba."

Pick, F. Sur un nouveau milieu au sang permettant la transmission rapide du *Trypanosoma cruzi* (formes sanguines et métacycliques) en formes leishmaniennes. [**New Medium for Conversion of Blood and Metacyclic Forms of *Trypanosoma cruzi* into Leishmanial Forms**] *Bull. Soc. Path. Exot.* 1957, Mar.–Apr., v. 50, No. 2, 217–19.

The author recalls observations by Romaña and Meyer [this *Bulletin*, 1945, v. 42, 972], who described the penetration of *Trypanosoma cruzi*

into cells of chick embryo tissue grown *in vitro*, where they were transformed into leishmanial forms. In the investigation described in the present paper, the author used as culture medium rabbit blood ingested by Reduviid bugs, which produced a dense homogeneous mass after haemolysis. In one set of experiments this medium was inoculated with blood trypanosomes from an infected mouse, in another with metacyclic trypanosomes obtained from infected *Triatoma*. In both cases the transformation of trypanosomes into leishmanial forms could be observed microscopically between slide and coverslip.

[The author apparently believes that the leishmanial forms produced by him *in vitro* were comparable to those obtained by Romaña and Meyer in tissue culture. However, this conclusion is fallacious, for the latter represent the intracellular stage of *T. cruzi* in the mammalian host, whereas the former correspond to bodies produced in the vector. The two types of leishmania are therefore not equivalent.] *C. A. Hoare*

Howard, J. E., Ríos, C., Ebensperger, Inés & Olivos, P. Enfermedad de Chagas congénita. [**Congenital Chagas's Disease**] *Bol. Chileno de Parasit.* 1957, July–Sept., v. 12, No. 3, 42–5.

The English summary appended to the paper is as follows:—

"Three cases of congenital Chagas's disease with demonstration of *Trypanosoma cruzi* in the blood are reported. Two of the patients were twin brothers.

"Hepato and splenomegaly were present in all cases while meningoencephalitis was observed only in two patients. Two chagomas developed in one infant, one of which became ulcerated perforating the hard palate; the same infant developed a hydrocele while on treatment with the presence of parasites in the fluid.

"Both mothers were asymptomatic, although they had positive Machado-Guerreiro's test. Xenodiagnosis was positive in one of the mothers.

"An epidemiological survey showed that triatomide-infection was possible at their homes."

Ghelelovitch, S. & Chassignet, R. Évolution de la parasitémie chez les souris infectées de *Trypanosoma cruzi*. Rôle de l'inoculate. [**Course of Parasitaemia in Mice infected with** *Trypanosoma cruzi*. **Role of Inoculum**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 135–43.

In mice infected with a strain of *Trypanosoma cruzi* maintained at the Pasteur Institute since 1949, the usual course of infection is as follows: the trypanosomes appear in the blood during the first fortnight after intraperitoneal inoculation; their number increases progressively until, by the 5th week, maximum parasitaemia is reached. If the mice do not

die, the number of parasites drops rapidly until, one or two weeks later, they are not detectable microscopically, though sometimes relapses occur. However, the course of infection is subject to variations, especially as regards the length of the incubation period and the degree of parasitaemia.

In order to ascertain the part played by the parasite in determining the course of infection, the authors studied the effect upon it of the size of the inoculum and of the physiological condition of the trypanosomes. In these experiments, variations due to the host were eliminated by using "pure-line" inbred strains of mice. The degree of parasitaemia was assessed by counting the number of trypanosomes per 100 microscopic fields in a fresh blood preparation.

The results were as follows. In a batch of mice inoculated with doses of 0·005 and 0·010 cc. of infected blood, parasitaemia was highest in those that received the larger inoculum, but the length of the incubation period was not affected by the number of trypanosomes inoculated. In another series of experiments, in mice inoculated from a donor at different periods of its infection (from 9 to 45 days), it was found that the older the infection the lower the parasitaemia attained and the longer the incubation period. The progressive lowering of the virulence of the trypanosomes with the age of the infection is attributed to the effect upon them of the immune reaction acquired by the host. *C. A. Hoare*

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Prata, A. & Domingues, A. Leishmanioide dérmico. [**Cutaneous Leishmanoid**] *Hospital.* Rio de Janeiro. 1956, Oct., v. 50, No. 4, 541–57, 6 figs. [56 refs.] English summary.

Review of the literature and report of a case in Brazil.

Prata, A. & Piva, N. Presença de leishmânias em pele aparentemente normal de pacientes com calazar. [**Presence of Leishmaniae in Apparently Normal Skin of Patients with Kala Azar**] *Hospital.* Rio de Janeiro. 1956, Apr., v. 49, No. 4, 481–6, 4 figs.

The English summary appended to the paper is as follows:—

"Examining apparently normal skin from seven patients with visceral leishmaniasis, the authors detected the presence of leishmaniasis in one of them. Comments are made on the epidemiological importance of these findings and the striking histological resemblance is emphasized between the lesions found in the case here studied and those of the so called post kala-azar dermal leishmaniasis."

See also p. 149, Herrer. *Phlebotomus* y DDT en el Perú. Experimentos sobre control de la verruga y la uta. [**Investigations on the Control of Carrion's Disease and Cutaneous Leishmaniasis**]

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order: general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Giroud, P. Observations et données expérimentales concernant les avortements chez l'homme et l'animal (rickettsioses, toxoplasmoses, néorickettsioses ou groupe psittacose). [**Experiments on Human and Animal Abortion in Relation to Rickettsioses, Toxoplasmosis, Neorickettsioses and Diseases of the Psittacosis Group**] *Arch. Inst. Pasteur de Tunis.* 1957, June, v. 34, No. 2, 187–206.

In 1948 the author and his brother, Professor Antoine Giroud, began a series of experiments on the effect of various infections of pregnant animals in producing malformations of the offspring. The results, however, showed few malformations but many abortions. For instance, of 62 rats infected intraperitoneally with suspensions of *Rickettsia prowazeki* from infected mouse lung, between the 5th and 15th days of gestation, 6 died, 34 had either no embryos or only dead embryos, and the remainder produced living embryos. Similarly, of 27 rats inoculated intraperitoneally with *Toxoplasma gondii*, 9 had no embryos and some of the rest had dead as well as living embryos. Of 21 pregnant rats inoculated with psittacosis virus between the 2nd and 17th days of gestation, 15 had either no embryos or only dead embryos. Comments are made on the fact that viruses of the psittacosis group can infect cattle, sheep and goats, and cause abortion, and brief records are given of a large number of animals which had aborted and which gave positive reactions to complement-fixation tests with the strain T 13 and other strains. Some of these were also positive to tests for brucellosis and Q fever, but many were negative. The author finally quotes a number of cases of abortion in women who showed serological evidence of infection with the psittacosis viruses at relevant times. He concludes that human and animal abortion may be due to ultramicroscopic organisms. *Charles Wilcocks*

Strzelecka, Halina & Wójciak, Zofia. Nowy preparat przeciw wszawicy. [**A New Insecticide against Head Lice**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 183–8. English summary (8 lines).

With the object of replacing imports of derris an investigation has been made of the insecticidal effects of extracts of *Delphinium consolida*, a

plant which is very common in Poland. The freshly cut material was extracted with ethanol for 3 weeks, and acetic acid was then added to the extract in a final concentration of 6%. Eggs of *Pediculus humanus humanus* immersed in the preparation for 15 minutes failed to hatch, whereas the mortality among eggs exposed to a preparation of derris for 60 minutes was incomplete (80%). Lice exposed to the preparation on filter paper in Petri dishes for 2 hours all died, and derris was equally effective, whereas no deaths occurred among lice exposed to a control preparation of 6% acetic acid in ethanol. *D. J. Bauer*

Koenoki, S. [**A Study of the Toxin of the Tsutsugamushi isolated from Wild Rats in Kyushu**] *Igaku Kenkyu.* Fukuoka. 1957, Sept., v. 27, No. 9, 2105–25, 4 figs. [64 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"The author succeeded by the use of mice in isolating four strains of Rickettsia nipponica from the spleens of wild rats caught in Fukuoka, Miyazaki and Kumakoto Prefectures.

"The strains isolated were found immunologically and serologically to belong to the Rickettsia orientalis.

"These strains were found inferior to any strain of Rickettsia orientalis hitherto identified in their toxic action on other animals: in concentration of 10^{-2} a hosts spleen emulsified did not kill a mouse, caused a slow and mild reaction in a rabbit, had no pathogenic effect on a guinea pig or a rat, and gave no marked sign of proliferation in a Yolk sac.

"When inoculated on the human body, the same emulsion caused a pathologic condition in all cases—a condition milder than one caused by any known strain of the Rickettsia orientalis and resembling the Tsutsugamushi disease of the Scrub Type.

"The conclusion reached was that some wild rats in Kyushu are afflicted with Tsutsugamushi disease."

Sasa, M., Tanaka, H., Ueno, Y. & Miura, A. **Notes on the Bionomics of Unengorged Larvae of** *Trombicula scutellaris* **and** *Trombicula akamushi*, **with special references to the Mechanisms of Cluster Formation and Reaction to Carbon Dioxide expired by the Hosts. (Studies on Tsutsugamushi, Part 90.)** *Japanese J. Exper. Med.* 1957, Apr., v. 27, Nos. 1/2, 31–43, 2 text figs. (11 figs. on 2 pls.) [12 refs.]

Orange-red patches on the tips of rocks and leaves were observed, on Hachijo Island south of Tokyo, to be masses of unfed larvae of *Trombicula scutellaris*. Plentiful material was obtained for laboratory studies on the behaviour of these larvae; field observations were also made on the clusters. In the laboratory, the clusters formed on cones of charcoal and

plaster of Paris, or triangles of card, isolated over a water surround and protected from air-borne stimuli by an inverted, deep, Petri dish. Clusters, if undisturbed, remained stable for up to 6 months. Fungal growths were checked by 1 in 10,000 merthiolate soaked into the cones. The value of this technique in maintaining stocks for other types of work is noted.

Clusters formed at the darkest part of the highest point on the cone, or paper. Once formed, there was little, if any, reaction to changes in light, air-movement, temperature, humidity, vapours of sweat and some volatile chemicals. Even rotation of the cone, or paper, to bring the cluster to a lower level elicited no reaction. Activity was stimulated only by carbon dioxide, and breath. Most of the mites would then display negative geotaxis and negative phototaxis and move to the highest, darkest point available. Field experiments gave similar evidence of the importance of carbon dioxide in breath in initiating movements of the clusters, and the trend upwards and away from light which could only then take place. Such responses bring the mites to points on vegetation, etc., suitable for quick transfer to passing hosts, but also shaded against desiccation while they await the activating stimulus of the carbon dioxide exhaled by an approaching host. The energy reserves of the mites are not dissipated uselessly, since physical factors (as observed in the laboratory and the field) do not activate the clusters. Results of this nature were obtained also with *T. akamushi* and *T. pallida*. They would form communal clusters. Gorged larvae did not show these habits; they were positively geotropic usually.

Photographs illustrate the laboratory and natural clusters, and various other aspects of the work. *D. S. Bertram*

Heisch, R. B., McPhee, R. & Rickman, L. R. **The Epidemiology of Tick-Typhus in Nairobi.** *East African Med. J.* 1957, Sept., v. 34, No. 9, 459–77, 12 figs.

In this study of tick typhus in Nairobi the authors collected large numbers of ticks in the affected area where 20 to 30 Europeans are treated yearly for the disease. The ticks, 2,170 in number, were divided into 112 batches, each of which was triturated and tested by guineapig inoculation. Among 25 batches made from 589 *Haemaphysalis leachi*, 9 yielded strains of rickettsiae; 3 of the positive batches consisted of ticks from dogs, 2 batches were from both cats and dogs, 3 were from burrows of *Otomys angoniensis* and 1 was from a leopard. Among 12 batches made from 435 *Rhipicephalus simus*, only 1, from a dog, was positive. Among 37 batches made from 483 *Amblyomma variegatum*, 2 were positive, 1 from a dog, the other from a cow. Negative results were obtained from the following ticks: 222 *Rhipicephalus sanguineus*, 283 *R. pulchellus* and 158 of 4 other species.

An attempt was made to find a clue to rodent reservoirs of infection

by Weil-Felix tests of sera of the following: 24 *Arvicanthis abyssinicus*, 18 *Otomys angoniensis*, 2 *Mastomys coucha* and 1 *Lemniscomys striatus*. All gave negative results. Sera from 3 out of 12 *Rattus rattus kijabius* agglutinated *Proteus OX19* at titres of 1 in 120 to 1 in 240.

Suspensions of brain and spleen of the following rodents were tested by guineapig inoculation: 84 *Otomys*, 30 *Arvicanthis*, 3 *Lemniscomys* and 1 *Mastomys*. Of these, 1 guineapig inoculated with *Otomys* brains developed a scrotal swelling on the 7th day but no rickettsiae were seen: another guineapig, inoculated with *Otomys* spleens developed scanty rickettsiae in the tunica vaginalis, and rickettsiae were isolated from the spleen of 1 *Lemniscomys*.

12 African volunteers were inoculated with rickettsiae isolated from *H. leachi*, *R. simus*, *A. variegatum* and *Otomys* sp. One reaction regarded as typical of tick typhus resulted from inoculation with a strain isolated from *R. simus* collected from a dog. The patient's temperature rose sharply on the 3rd day and lasted as a high-remittent fever till the 10th day when it fell rapidly to normal after treatment with chloramphenicol, becoming normal by the 12th day. Blood taken from this patient on the 5th and 6th days was inoculated intraperitoneally into 4 guineapigs. 2 of these animals developed scrotal reactions, 1 of which yielded scanty rickettsiae from tunica smears. This patient's *Pr.OX19* titre rose from zero to 1 in 960 on the 22nd day; the *Pr.OX2* titre rose from zero to 1 in 60 on the 22nd day and to 1 in 120 on the 36th day.

Another patient inoculated with the *R. simus* strain gave only a slight reaction, slight fever on the 3rd and 4th day; there was no significant rise in the Weil-Felix titre.

The other 10 patients developed some degree of fever; from the charts it appears that in most cases the temperature rose suddenly on the 2nd or 3rd day after inoculation and then ran an irregular intermittent or deeply remittent course lasting 3–10 days. The Weil-Felix responses, except for the one mentioned above, showed no significant rises in titre but in 5 of the 10 cases the pre-inoculation titre for *Pr.OX19* was already 1 in 120 or 1 in 240, and this observation was regarded as showing that several of the patients were already partly immune before inoculation. Such immunity would also explain the anomalous types of febrile response. The *Pr.OX2* titre was strikingly lower than the *Pr.OX19* response except in one case in which it was higher, but the titre was only 1 in 60.

No eschar was seen though several of the patients were inoculated intradermally as well as subcutaneously.

Sera of 19 street dogs and 4 puppies were tested; 6 of the adults reacted with *Pr.OX19* at 1 in 120 or 1 in 240; with *Pr.OXK* 16 dogs and 1 puppy reacted at 1 in 120 or 1 in 240. 2 adult dogs and 3 puppies were inoculated with strains isolated from *R. simus* and *H. leachi*. The results are described as " rather inconclusive ".

The authors believe that in nature the role of dogs is "more likely to be passive than active". They also found it difficult to draw conclusions from the inoculations into African volunteers, though apart from the case described as typical there was a case of severe laboratory infection in a European who had handled a hamster lung intensely infected with a strain from *H. leachi* or *R. simus*; these are the two ticks which are regarded as the chief vectors in Nairobi.

Cross-immunity experiments on guineapigs gave positive results with all the strains tested.

The authors regard the present study as incomplete in the absence of rickettsia-agglutination and complement-fixation tests and because no rickettsiae of human origin were available for comparison with those obtained from ticks.

After the paper was written some complement-fixation findings were received from J. H. S. Gear of South Africa. These are not reported but Gear is said to have concluded that the strains are closely related to, if not identical with, the rickettsiae of South African tick-bite fever, which are named *Rickettsia conori* var. *pijperi*. The authors object to this name. They point out that the name *R. conori* was originally given by Brumpt to North African strains; these are said to differ from South African and East African strains which if shown to be specifically different from *R. conori* ought to be called *Rickettsia pijperi*.

[The authors have raised the very difficult question of the presence or absence of truly specific relationships between the various strains of tick-borne typhus rickettsiae in Africa. The same difficulty arises in connexion with the numerous tick-borne typhus fevers in the other continents of the world. Much work remains to be done before it will be possible to establish a reliable definitive classification of these fevers and their causal rickettsiae. In the meantime the nomenclature provisionally suggested by the abstracter in 1921 "tick typhus", with the addition of the name of the country in which the disease occurs, supplies a distinctive descriptive name for each form of the disease without causing prejudice to the definitive classification and nomenclature.]

[See also this *Bulletin*, 1957, v. 54, 1068.] *John W. D. Megaw*

Rychlo, A., with the technical assistance of Katarína Jonecová. Metóda farebného znázornenia rickettsií v histologických rezoch. [**A Method of Staining of Rickettsia in Histological Sections**] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague. 1957, v. 6, No. 4, 266–9. [13 refs.] English summary (4 lines).

The author has developed a method of staining rickettsiae in sections which has been used satisfactorily in the examination of 1,000 pieces of tissue from guineapigs infected with *Rickettsia burneti*. The tissue is fixed in Helly solution (5% mercuric chloride in 2·5% aqueous potassium

dichromate) for 3–5 hours, according to size, and embedded in paraffin. The sections are treated with a solution of iodine and potassium iodide in 70% alcohol for 20–30 minutes, placed in 0·25% aqueous sodium thiosulphate for a few minutes to remove excess iodine, washed in water and placed in *p*H 7·4–7·6 phosphate buffer. The sections are then stained in Giemsa for 15–20 hours, washed and differentiated in the phosphate buffer to the required intensity of staining, and then in 0·01% citric acid until the red cells become pink (1 minute); differentiation is then arrested by immersion in buffer and the sections are dehydrated in acetone and cleared in xylene. The rickettsiae are stained dark bluish-violet against a pale background. *D. J. Bauer*

Abinanti, F. R. & Marmion, B. P. **Protective or Neutralizing Antibody in Q Fever.** *Amer. J. Hyg.* 1957, Sept., v. 66, No. 2, 173–95, 1 fig. [30 refs.]

In this study of the properties of Q fever immune sera it was first established that specific antigen of *Rickettsia burneti* could be detected by means of the complement-fixation (CF) test in extracts of the spleens of mice which had been inoculated with *R. burneti* 7 days previously. The immune rabbit serum which was used for these CF tests contained antibody for phase I rickettsial antigen [see this *Bulletin*, 1957, v. 54, 1171]. The inhibitory effect of immune serum on *R. burneti* was shown by the failure of rickettsial antigen to develop in the spleens of animals injected with *R. burneti* which had been exposed to serum overnight at 4°C. It was also possible to demonstrate this effect by making comparative microscopic counts of rickettsiae in spleen smears and by the differences in mean spleen weights.

When mice were inoculated with *R. burneti* which had been treated with immune rabbit serum previously absorbed with phase I rickettsiae, the protective effect of the serum was abolished; serum absorbed with phase II rickettsiae did not lose its protective effect. The protective action of a serum seemed to be related to its content of complement-fixing antibody against phase I antigen. Thus, sera from persons who had been inoculated with *R. burneti* vaccine showed a rough proportionality between their content of complement-fixing antibody to phase I antigen and their ability to inhibit the formation of rickettsial antigen in mice. Whey prepared from the milk of cows infected with *R. burneti* was strongly protective, although antibody reacting in the CF test was not present in significant amounts.

The part played by phase I antigen in relation to immunity is discussed. It is thought likely that the protective phase I antibody may be formed in response to a vaccine in which phase II antigen predominates; rabbits inoculated with such vaccines have produced small amounts of phase I antibody. The use of CF tests to detect the development of rickettsial

antigens in the tissues of infected animals, and so to measure antibody which inhibits this development, may have general applications.

R. S. F. Hennessey

Lutyński, R. & Dolezal, Marian. Przeciwciała niekompletne u chorych na gorączkę Q i ozdrowieńców. [**Incomplete Antibodies in Q Fever Patients and Convalescents**] *Med. Dośw. i Mikrob.* Warsaw. 1957, v. 9, No. 3, 289–92. English summary (8 lines). "

The authors have investigated the use of the Coombs test for the detection of incomplete antibody in the diagnosis of Q fever. The antigen consisted of a suspension of the Nine Mile or Henzerling strains of *Rickettsia burneti*; it was incubated with serial dilutions of the test serum at 37°C. for 12 hours; the sensitized rickettsiae in each tube were recovered by centrifugation, washed 3 times with saline, resuspended in saline to the original volume and incubated for 12 hours at 37°C. with 1 drop of antiglobulin serum. A positive result was shown by the formation of a deposit of agglutinated rickettsiae which formed visible floccules on resuspension.

With sera from 3 persons convalescent from Q fever the test gave titres of 1560–5120 with the Henzerling and 1280 with the Nine Mile antigen, compared with titres of 40–80 by the complement-fixation test and 10–40 by the micro-agglutination test. The test was also carried out on paired sera taken on the 2nd–5th and 14th–18th days of illness from 3 patients suffering from Q fever; and a 4–16-fold rise of titre was demonstrated in all cases. The results obtained by the other methods were less satisfactory. A positive result was obtained by Coombs and microagglutination tests with the serum of 1 of 3 persons who had been in contact with infective material.

D. J. Bauer

Ramos, H. S., Hodges, R. E. & Meroney, W. H. **Q Fever: Report of a Case simulating Lymphoma.** *Ann. Intern. Med.* 1957, Nov., v. 47, No. 5, 1030–35, 2 figs. [16 refs.]

" A case of Q fever with initial findings suggestive of an acute lymphomatous process has been presented and reviewed. Some of the common complications of Q fever have been discussed. It was not possible to discover the source of the infection in the present case, which appeared in a nonendemic area."

Rocco, L. & Di Giacomo, Bruna E. Su di un caso di febbre Q con pneumopatia in un lattante. [**A Case of Q Fever with Pneumopathy in an Infant**] *Acta Med. Italica.* 1957, Sept., v. 12, No. 9, 252–4, 2 figs. & 1 graph. [13 refs.]

Roger, F. & Roger, Annie. La vaccination contre les affections humaines ou animales à *Rickettsia burneti*. Étude expérimentale de l'immunisation par antigène vivant ou par antigène tué. Mécanisme des intolérances vaccinales. Intervention de phénomènes allergiques dans le pouvoir pathogène de la Rickettsie. [**Experimental Study of Immunization with Living and Killed Antigens from *Rickettsia burneti*. Mechanism of Reactions and Presence of an Allergic Reaction**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 355–60.

This article, which is based on work forming the subject of a university thesis, summarizes observations relating to the development of immunity in rabbits inoculated with living and formolized preparations of *Rickettsia burneti*, with special reference to the significance of reactions at the site of inoculation. Living organisms produced a level of immunity inferior to that obtained with killed organisms, which gave rise to a persistent nodule. The authors consider that specific antibody formation is closely related to the formation of this nodule (*granulome rickettsien*), within which antigen is believed to persist and maintain an allergic reaction. [No experimental data are presented.] *R. S. F. Hennessey*

BARTONELLOSIS

Herrer, A. *Phlebotomus* y DDT en el Perú. Experimentos sobre control de la verruga y la uta. [**Investigations on the Control of Carrion's Disease and Cutaneous Leishmaniasis**] *Rev. Med. Exper.* Lima. 1956, Dec., v. 10, No. 2, 99–137, 7 figs. (1 folding) on 5 pls. & 1 folding plan. [11 refs.] English summary.

The English summary appended to the paper is as follows:—

"In order to ascertain the range of activity of DDT in preventing Carrion's disease (verruga peruana) and cutaneous leishmaniasis (uta) in the native population of endemic zones, two controlled field experiments were carried out with the insecticide. One was in Surco and the other in San Juan, both localities in the Rimac Valley [about 64 kilometres (40 miles) from Lima at an altitude of 2013 metres (6600 feet)].

"In Surco, a locality with indigenous population, DDT was applied in 1947 and 1948 to the 'pircas' (stone walls) within the town as well as in the adjacent fields but not in human dwellings. In San Juan, DDT was applied only to the walls of the buildings in 1947 and 1948, and to the neighbouring 'pircas' in 1949. San Juan is the city of an agricultural

school, in which the majority of the student population is not immune to either Carrion's disease or cutaneous leishmaniasis.

" To evaluate the results of these experiments, the decrease in the ' verruga ' and ' uta ' incidence and the reduction in the population of the insect vector, *Phlebotomus verrucarum*, were taken as parameters.

" A summary of the results so far obtained is as follows:

" 1. Surco experiment.

" a) Two years after the onset of the experiment, the incidence of cutaneous leishmaniasis in dogs decreased from 22·0 to 1·6 per cent.

" b) The incidence of both ' verruga ' as well as ' uta ' in the pre-school children evaluated six years after the first spraying of insecticide decreased so greatly that it suggests that transmission had stopped altogether during that lapse of time. The few cases observed during the experiment probably were infected outside the experimental zone.

" c) In spite of the fact that DDT was applied only to the ' pircas ', the sand fly (*P. verrucarum*) population decreased in all the dwellings which served as sample experimental areas up to and including 1953.

" d) In three caves also used as sample experimental areas in which *Phlebotomus noguchii* was present the sandfly population also decreased appreciably, but only between 1948 and 1950. It is assumed that the sandfly population decrease was caused by the disappearance of rodent hosts from the caves rather than [by] a direct action of the insecticide that was sprayed on the neighbouring ' pircas '.

" 2. San Juan Experiment.

" a) The spraying of DDT in 1947 considerably reduced the incidence of verruga during the remainder of that school year (June to December) among the student population while during 1948 not a single case of the disease was reported.

" b) Although no more blood cultures were made after May, 1949, new cases of verruga were extremely rare among students up to 1953.

" c) In all buildings sprayed with insecticide the sandfly population decreased to insignificant levels, except with small variations which persisted to the end of 1953.

" d) As a result of spraying insecticide in the students' dormitories a remarkable reduction of sandfly population was observed on the neighbouring ' pircas ', even though the ' pircas ' were not sprayed with DDT during 1947 and 1948." [See this *Bulletin*, 1948, v. 45. 884.]

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Boshell M., J. & Groot, H. Encuesta inmunológica sobre fiebre amarilla en primates silvestres de América Central (1952–1957). [**Immunological Survey of Yellow Fever in Jungle Primates in Central America (1952–1957)**] *Bol. Oficina Sanitaria Panamericana.* 1957, Oct., v. 43, No. 4, 309–22, 1 fig.

The English summary appended to the paper is as follows: —

"A report is given on an immunity survey carried out among primates in Nicaragua, Honduras, and Guatemala between July 1952 and September 1956, including a list of the species concerned and a description of the techniques utilized. Thought is given to future reconsideration of these techniques in the light of knowledge acquired recently on the presence of related viral antigens in the regions covered. The article concludes with some remarks on the need for keeping in mind the existence of such antigens in interpreting the results of the neutralization tests for yellow fever, and for using those antigens in testing the sera obtained in regions of epidemiological interest."

Macdonald, W. W. *Aëdes aegypti* **in Malaya. III.—Experiments on Control and Eradication.** *Ann. Trop. Med. & Parasit.* 1957, June, v. 51, No. 2, 175–86, 3 figs. [15 refs.]

The previous papers in this series [see this *Bulletin*, 1957, v. 54, 560] have dealt with the distribution and biology of *Aëdes aegypti* in Malaya. The present paper records experiments on control in 3 localities. In one village which had an *A. aegypti* index of 69%, a group of houses was sprayed once on all inside walls and doors (referred to as total spraying) with 5% DDT emulsion at an intended dose of 200 mgm. per square foot and an actual dosage of 168 mgm. The index fell rapidly in the houses in the totally sprayed area; no adults and only 2 larvae were detected during the 6 months after spraying. Mature *A. aegypti* larvae were then introduced into the area on 6 occasions, starting 25 weeks after the spraying. One or two breeding foci became established probably as a result of the introduction. At 18 months after the spraying *A. aegypti* was slowly spreading in the sprayed area (index now 17%), and it was concluded that "total spraying" can be considered as effective for a year only.

In another group of houses, spraying of the same form and dosage of insecticide was confined to potential breeding places and the adjacent walls (perifocal spraying). Many of these were out of doors so that the insecticide was washed off and residual action was soon lost. After 25 weeks the *A. aegypti* index had stabilized below 10%. The area was resprayed at 33 weeks but though the index fell to 4% a few foci persisted.

About a year after the second spraying the index was only 3%. The results of perifocal spraying on two occasions compared favourably with those of a single spraying of the interiors of all houses.

In another village crudely made insecticide pellets of plaster of Paris and DDT dispersible powder were placed in all water containers on 6 occasions at intervals of 4 weeks. Temporary containers were upturned. The *A. aegypti* index, originally 38% for shop-houses and 16% for dwelling-houses, had fallen below 5% after 2 treatments, and at 20 weeks was 0% for shop-houses. Larval foci reappeared and persisted in a few dwelling-houses which raised the village index to some 3% between 16 and 81 weeks, but at 81 weeks only one larval focus was found. *Culex fatigans* and *A. albopictus* were less affected than *A. aegypti*.

In Port Swettenham total spraying was applied to all houses in the town on 5 occasions in 2 years with DDT emulsion at an intended dosage of 100 mgm. per square foot. 6 months later the town was resprayed with 200 mgm. per square foot. *A. aegypti* still remained relatively common. Tests showed that actual dosage was less than half that intended and some rooms had not been sprayed. After the introduction of perifocal spraying with 1% dieldrin the index fell to 3%. Spraying was repeated 4 weeks later, and 8 months later the index was still below 1%. The evidence suggests that once the *A. aegypti* index is reduced below 1% increase and spread of the species are very slow and can be prevented by immediate treatment of any breeding places discovered at annual or semi-annual check surveys. Eradication is not aimed at because of potential reinfestation by coastal craft using the harbour. *T. H. Davey*

Cannon, D. A., Dewhurst, F. & Meers, P. D. **Mass Vaccination against Yellow Fever by Scarification with 17D Strain Vaccine.** *Ann. Trop. Med. & Parasit.* 1957, Sept., v. 51, No. 3, 256–63, 1 fig.

This paper gives the serological results of two mass vaccination campaigns against yellow fever carried out in rural areas of West Africa by means of the 17D strain of virus applied by scarification of the skin. The two areas involved, one in Sierra Leone, the other in the Gambia, were similar in many respects: both were coastal and bordered extensive estuaries; each covered about 100 square miles and supported a population of just under 20,000; both contained an international airport, Lungi in Sierra Leone and Yundum in the Gambia; and in both the natural immunity level was known to be low. In the text the campaigns are referred to as the Lungi and the Yundum trials, respectively.

In the Lungi trial, in which 13,200 of the 18,000 inhabitants were vaccinated, chick-embryo vaccine only was used, the virus dose applied per person being between 2,000 and 3,200 LD50. Owing to political unrest, which also accounted for 26% of the population escaping vaccination, only 320 pre- and post-vaccination sera became available for the

mouse protection test. In the Yundum trial, in a population of just under 18,000, 17,680 vaccinations were performed and of these 6,381 (Group I) were carried out with mouse-brain vaccine [this *Bulletin*, 1955, v. 52, 1185] and 11,299 (Group II) with chick-embryo vaccine [*ibid.*, 1954, v. 51, 567], the virus dose applied per person being between 1,500 and 2,000 LD50 in Group I and between 1,500 and 2,500 LD50 in Group II, respectively. 293 pre-vaccination and 289 post-vaccination serum specimens were collected from Group I and 100 pre-vaccination and 99 post-vaccination specimens from Group II. Of the paired blood samples collected in both trials from volunteer donors, the "pre-" vaccination specimens were obtained immediately after vaccination and the post-vaccination specimens some 30 days later. For determination of the immunity conferred, a slight modification of Smithburn's intraperitoneal protection test was used throughout.

The results of tests on those sera which proved fit for examination are as follows:—

Campaign	Pre-vaccination sera			Post-vaccination sera that before vaccination were				
				Inconclusive		Negative		
	No. positive	No. inconclusive	No. negative	No. positive	No. inconclusive	No. positive	No. inconclusive	No. negative
Lungi	49	14	219	12	2	195 (89·0%)	14 (6·4%)	10 (4·6%)
Yundum (chick embryo vaccine)	24	2	24	1	1	20 (83·3%)	1 (4·2%)	3 (12·5%)
Yundum (mouse brain vaccine)	125	17	100	16	1	87 (87·0%)	4 (4·0%)	9 (9·0%)
Totals	198	33	343	29	4	302 (88·0%)	19 (5·6%)	22 (6·4%)

A figure of 88% for the conversion rate produced by this method of immunization was thus obtained—a percentage which could be further elevated, if some or all of the 5·6% inconclusive results were added, and if the failures were restricted to a possible minimum of 6·4%. Such a percentage of success provides conclusive evidence of the value of the method in protecting the indigenous populations of endemic or potentially epidemic areas. Apart from the demonstrated efficiency of the vaccine, the technique of vaccination by scratch is simple and can readily be taught to comparatively untrained personnel. The authors feel justified in claiming, therefore, that this is the technique of choice for the mass immunization of populations in the areas indicated. Moreover no untoward reactions were observed to follow the application of this method in the two trials described. *G. Stuart*

DENGUE AND ALLIED FEVERS

HOTTA, S. **Some Immunological Properties of Dengue Virus cultivated in Tissue Culture.** *Ann. Trop. Med. & Parasit.* 1957, Sept., v. 51, No. 3, 249–55. [14 refs.]

Intramuscular inoculation of mice with live type 1 dengue virus from rhesus monkey kidney tissue cultures [this *Bulletin*, 1957, v. 54, 282] caused no deaths. When these mice were challenged by intracerebral injection of mouse-passaged virus, definite immunity of a low order was apparent; the LD50 of the challenge preparation for inoculated mice contained about 500 times more virus than the LD50 for control groups.

The immunogenic effect of tissue-cultured virus was also tested by inoculating 2 rhesus monkeys intracutaneously. No abnormal rises in temperature were recorded and viraemia was not detected. Sera from these animals gave neutralization indices of 100 and 178 against type 1 dengue virus at 30 days after the first injection, the indices rising to 1,779 and 10,000 at 7 days after a second injection (given 73 days after the first). Although the living tissue-cultured virus stimulated good antibody production in monkeys, it would be hazardous to attempt to immunize human beings with live virus from such tissue cultures; the presence of pathogenic viruses in tissue cultures from apparently normal monkeys requires further investigation. *R. S. F. Hennessey*

ROWAN, L. C. **Recent Work on Dengue Fever.** *Med. J. Australia.* 1957, Oct. 12, v. 2, No. 15, 530–33. [47 refs.]

A general review and discussion.

RABIES

SARTORIUS, F., STARKE, G. & WINKLER, C. Betrachtungen und Lehren zu einer Anzahl von menschlichen Tollwuttodesfällen der letzten Jahre. [**Observations on a Number of Human Cases of Rabies occurring in Recent Years**] *Ztschr. f. ärztl. Fortbildung.* 1957, Aug. 1, v. 51, No. 15, 638–44. [28 refs.]

A description is given of 3 cases of rabies which occurred in West Germany in 1956. (1) A boy aged 17, who had been bitten in the thumb by a fox: after 15 days difficulty in breathing appeared, with hyperhidrosis, exaggeration of reflexes, convulsions and pharyngeal spasms in response to water. Treatment by artificial hibernation was attempted, but death occurred on the 7th day of illness. (2) A boy aged 17, who

had been bitten in the finger by a fox: 2 days later he attended for treatment, and was given 4 cc. of Hempt vaccine on 6 successive days. A second course of treatment after 18 days was refused, and on the 45th day pain appeared at the site of injury, followed by the gradual development of the typical picture of furious rabies with death on the 50th day. (3) A boy aged 6, who had been bitten on the arms by a dog, which was killed and examined: Negri bodies were found, and on the 3rd day a course of injections was begun, in which 6 doses were given within 9 days. After 25 days, 2 days before the time fixed for the second course of vaccination, the boy fell ill with malaise and pharyngeal spasm, and death occurred in coma on the 30th day. *D. J. Bauer*

Bulling, E. Die Komplementbindungsreaktion als Hilfsmittel für die Tollwutdiagnostik. [**Complement-Fixation in the Diagnosis of Rabies**] *Zent. f. Bakt.* I. Abt. Orig. 1957, v. 169, Nos. 3/4, 161–78. [20 refs.]

A rabies complement-fixing antigen was prepared by grinding infected brain material with 6 volumes of saline, freezing and thawing 3 times, centrifuging for 45 minutes at medium speed and preserving the supernatant fluid with 1 in 10,000 Merthiolate. The antigen retained its activity for 2–3 weeks at 4°C. and was diluted 1 in 2 or 1 in 4 before use.

Immune sera for the detection of the antigen were prepared by the intramuscular infection of rabbits with fixed rabies virus. The complement-fixation reaction enabled the presence of rabies virus to be satisfactorily demonstrated in antigens prepared from the brains of 10 dogs, 4 guineapigs and a hen, which had been shown to be infected by the detection of Negri bodies or by animal inoculation. Antigens prepared from the brains of more than 200 experimentally infected mice also gave positive results.

The method was further tested by the examination of 103 brains of various animals sent from various parts of West Germany for the diagnosis of rabies. Of 56 brains in which Negri bodies were found 54 fixed complement with rabies immune serum; a positive result was also obtained with 5 brains in which Negri bodies could not be found.

The percentage of correct diagnoses by the complement-fixation test was therefore 98% of positive and 91·5% of negative results; a positive result was also obtained in 7 instances in which it was not possible to isolate the virus by animal inoculation. *D. J. Bauer*

McDaniel, G. E. **Experiences in the Treatment of Human Beings with Antirabic Vaccine in South Carolina.** *Southern Med. J.* 1957, Nov., v. 50, No. 11; 1369–71.

"Reduction of animal rabies and human antirabies treatments in South Carolina under the state-wide rabies control program has been gratifying.

"Antirabies vaccine was not indicated in 36 to 46 per cent of persons in South Carolina receiving the vaccine during the past 5 years.

"Three deaths have occurred during the past 5 years from antirabies vaccine encephalitis.

"Antirabies serum should be used more generally in severe face and head bites by rabid animals."

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Girard, G. Considérations sur une souche de *Pasteurella pestis*, isolée à partir d'un cheval au Congo belge. Son étroit apparentement à la souche EV (Girard et Robic). [**Observations on a Strain of *Pasteurella pestis* isolated from a Horse in the Belgian Congo. Its Apparent Relationship to Strain EV**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 346–50.

An avirulent, non-glycerol-fermenting strain (Elis) of *Pasteurella pestis* which was stated to have been isolated from the nasal mucus of a horse at Elisabethville in 1950 [this *Bulletin*, 1955, v. 52, 358] bore a striking resemblance to the avirulent strain EV. In view of the fact that non-glycerol-fermenting strains of *P. pestis* have not been found in the endemic plague areas of the Belgian Congo, the lack of any evidence of human or murine plague in the Elisabethville area, and the resistance of horses to plague infection, the Elis strain was critically compared with the EV strain. Among points specially noted were the enhancement of virulence in mice treated with cortisone, the presence of antigens V and W, production of fraction 1 antigen, uracil requirement, failure to produce pigmented colonies on media containing haemin, resistance to phagocytosis, and sensitivity to a set of bacteriophages. All these features were identical in the 2 strains, and it is concluded that the Elis strain was derived from the EV strain. [As to how this occurred, the author makes no suggestion.] *R. S. F. Hennessey*

Crumpton, M. J. & Davies, D. A. L. **A Protein Antigen associated with Smooth Colony Forms of some Species of *Pasteurella*.** [Correspondence.] *Nature*. 1957, Oct. 26, v. 180, 863–4, 1 fig.

Agar diffusion analysis revealed the presence of an antigen (antigen 4) in smooth strains of *Pasteurella pestis*. This antigen, which appeared to represent the only antigenic difference between smooth and rough

strains, was found in maximal amount in aerated broth cultures grown at 37°C. and at a *p*H close to neutrality. Killed cultures of smooth strains gave no better protection than did killed cultures of rough strains when injected as vaccines into mice, but living smooth cultures of an avirulent strain (Tjiwidej) gave between 20 and 100 fold better protection than killed smooth cultures of this strain. Antigen 4 appears to favour the survival of smooth organisms *in vivo*, thus prolonging the stimulus for protective antibody production. Neither *P. aeptica* nor *P. haemolytica* produced antigen 4 but all virulent *P. pseudotuberculosis* strains did so. Some strains of *P. pseudotuberculosis* which had lost their smooth O somatic antigen and were smooth in colonial form contained antigen 4. The addition of a purified preparation of antigen 4 to a suspension of rough organisms delayed sedimentation, and it is thought likely that this antigen may be related to the smooth colonial form of an organism which is rough in the *Salmonella* sense. *R. S. F. Hennessey*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order: epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Lamy, L. & Molinari, V. Enkystement spontané et provoqué d'*Entamoeba histolytica* en culture. [**Spontaneous and Induced Encystation of *Entamoeba histolytica* in Culture**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 81–4.

It is well known that after prolonged maintenance in cultures the trophozoites of *Entamoeba histolytica* gradually lose the power to encyst. The authors describe the behaviour of 3 strains maintained by them in culture: one (*Ma*), which has been grown since 1946 (804 subcultures), conforms to the above pattern and does not produce cysts, whereas the other two (*Lx* and *Br*), though cultivated continuously since 1953 (240 subcultures) and 1955 (102 subcultures) respectively, continue to encyst spontaneously.

In an attempt to induce strain *Ma* to encyst, after maintenance *in vitro* for 11 years in the trophozoite stage, the authors adapted it to growth in an egg medium without rice starch. After cultivation in this manner through 31 passages, the amoebae were transferred to the same medium, but with addition of rice starch, with the result that encystment took place. It was thus demonstrated that strain *Ma* had not lost the power of encystation after growing in culture for about 15,000 generations (= 800 subcultures) in the course of 11 years. *C. A. Hoare*

Shaffer, J. G., Conner, Phyllis & Rosenthal, Gladys. **The Effect of Penicillin G on Two Strains of Small Race** *Entamoeba histolytica* **in Culture.** *Amer. J. Trop. Med. & Hyg.* 1957, July, v. 6, No. 4, 646–53, 1 fig. [25 refs.]

The differentiation of *E. histolytica* into two races based arbitrarily on the size of cysts above or below 10 μ in diameter is now widely accepted. The smaller races, unlike the larger, were not easily maintained in culture till the charcoal medium of McQuay [this *Bulletin*, 1957, v. 54, 570] was introduced. The effect of penicillin G on two strains of the small race and two of the large race has now been studied. Two types of media had to be used to obtain good propagation of all 4 strains. One consisted of egg slants with overlay of Locke's solution, the other of liver slants with overlay of human serum in the same solution.

The effect of 8 concentrations of the drug ranging from 82 to 1,316 units per ml. of medium, inoculated with equal amounts of *E. histolytica* suspension, showed that peculiar degenerate forms resembling *Blastocytis hominis* occurred only in the strains of the small race and even then to a different extent in the two strains as indicated by microscopic examination after 48 hours' incubation at 37°C. It was not established whether the difference in result was partly due to the types of media employed or to an indirect effect of the drug on the accompanying bacterial flora. It is possible that the occurrence of these degenerate forms indicates a difference between the large and small races not hitherto recognized. The propagation of the small races was also inhibited by concentrations of penicillin G which did not affect the large race.

J. D. Fulton

Rodrigues da Silva, J. Exploração funcional hepática na amebíase. [**Liver Function Tests in Amoebiasis**] *Bol. Centro Estudos Hosp. Servidores Estado.* Rio de Janeiro. 1957, June, v. 9, No. 6, 161–82, 2 figs. [42 refs.]

The English summary appended to the paper is as follows:—

"The author discusses in this paper the problem of liver involvement in amoebiasis, through the functional stand point. After a review of the medical literature about the subject, the results are given of several liver function tests, performed in 40 cases of chronic amoebiasis, 7 of which were in an acute phase of the disease.

"It was found among these 40 cases that the hepatic function tests were more intense and showed greater percentage of positivity in the cases of amoebiasis complicated by other morbid conditions.

"In the non complicated cases only one had 3 or more positive tests, in 3 cases 2 tests were positive, in 8 cases only one positive test and in 6 cases no test was positive. The following tests performed were grouped according to the frequency in which they were positive: hippuric acid (intra-venous route) in 4 cases; urinary urobilinogen (Erlich-Watson) in

2 cases; cephalin colesterol flocculation (Hanger modified by Neefe), Thymol turbidity (MacLagan) and one minute hyperbilirubinemia in one for each test."

Efrati, P. [**Clinico-Pathological Observations on Amebic Abscesses of the Liver**] *Harefuah*. Jerusalem. 1957, Oct. 1, v. 53, No. 7 [in Hebrew 165–70, 1 chart. English summary 170–71].

The English summary appended to the paper is as follows:—

"The clinical picture of amebic abscess of the liver, its sequelae and the diagnostic difficulties are illustrated by a series of 6 cases.

"1. A 49 year old man was hospitalized because of diarrhea and fever of several weeks duration. The liver extended 8 cm. below the costal margin. The blood sedimentation was rapid and there was a marked leukocytosis. The liver tests were negative except for retention of bromsulphalein. Treatment with penicillin brought no improvement but after 3 injections of emetine he became afebrile, and subsequently the liver returned to its normal size. Latent diabetes mellitus became more severe but once the liver abscess subsided the blood glucose level returned to normal.

"2. A 76 year old man was admitted because of fever. On admission he complained of pain in the liver area. Shortly afterwards he became stuporous. The stools were normal in appearance and negative for amoebae. His condition deteriorated rapidly and at autopsy two liver abscesses and multiple necrotic ulcers of the ascending colon due to amebae were found.

"3. A 39 year old man with a liver abscess developed jaundice. We feared the abscess might perforate into the peritoneal cavity. On operation a typical amoebic abscess was found and drained. After operation he was treated with emetine and recovered completely.

"4. A 23 year old man whose first sign of disease was a pleural effusion. While being treated with sulfa a liver abscess discharged into a bronchus forming a bronchohepatic fistula. He expectorated from 500 to 1000 ml. of bile daily. X-ray revealed another abscess in the lower lobe of the right lung. He was operated on and recovered completely.

"5. A 61 year old man presented a typical picture of a chronic amoebic abscess of the liver. X-ray of the abdomen revealed a calcified echinococcus cyst of the spleen. While on emetine treatment the liver abscess discharged its content first into the duodenum (gas was observed in the liver) and later into the colon. He died from hemorrhage from the liver abscess.

"6. A 58 year old man who had been treated with aralen for an amoebic abscess of the liver. A few weeks later he was admitted with a recurrence of complaints and was again treated with emetine. Although apparently improving, he suddenly experienced severe retrosternal pain accompanied by dyspnea and signs of heart failure and expired a few days

later. Autopsy revealed an amoebic abscess of the liver, which penetrated into the pericardium and tamponaded the heart.

"We emphasize the importance of increased serum alkaline phosphatase and retention of bromsulphalein in the diagnosis of liver abscess. Attention is drawn to the sudden appearance of pain in the right shoulder as an early sign of diaphragmatic penetration."

Bellidenty, C. & Potier, D. L'amibiase pleuro-pulmonaire suppurée en milieu africain. A propos de 5 cas. [**Suppurative Pleuro-pulmonary Amoebiasis in Africans. An account of 5 Cases**] *Méd. Trop.* Marseilles. 1957, Sept.–Oct., v. 17, No. 5, 689–96.

It is an incorrect belief that hepatic involvement is peculiar to Far Eastern amoebiasis and not to African. Intrathoracic amoebiasis in fact is by no means exceptional in Africa. This is a record of illustrative cases of pulmonary amoebiasis encountered in Africans in the French Cameroons quite recently. Details are given of each case; all presented themselves with a history of lung troubles, often of some months' duration, and physical signs of lung and pleural involvement (in 4 of the 5 at the right base). It seems that stools from only 2 of the 5 patients were examined for parasites, and amoebae were identified in only one of them. No amoebae were found in the sputa of these patients. There was in each case evidence of liver involvement (enlargement and pain). 4 of the 5 patients responded specifically to treatment with emetine (it was contraindicated in the fifth), which the authors consider the drug of choice for intrathoracic amoebiasis. *A. R. D. Adams*

Radke, R. A. & Baroody, W. G. **Carbarsone Toxicity: a Review of the Literature and Report of 45 Cases.** *Ann. Intern. Med.* 1957, Sept., v. 47, No. 3, 418–27, 1 fig. [15 refs.]

In the literature there are reports of toxicity due to carbarsone treatment; some of these are detailed but others are couched in general terms. The authors have personally encountered 45 examples of toxic reaction to carbarsone treatment in 1,500 patients treated by them for amoebiasis. Most (36) of the 45 patients developed fever, epigastric burning, abdominal pain, diarrhoea, nausea and vomiting. These ceased on withdrawal of the drug, but BAL was given in the most severe cases and it produced a very rapid amelioration. In 3 further instances an exfoliative dermatitis developed; in 5 there was central nervous system involvement; and in the remaining case both the central nervous system and the liver were involved.

2 of the 5 victims of arsenical encephalopathy died in spite of anticonvulsant and of BAL treatment; in both instances the carbarsone proved to have been contaminated with arsanilic acid. (One of the

patients, a child, had also been grossly overdosed.) Detailed case reports are given of some illustrative cases, and there are photomicrographs of biopsy material obtained from the liver of a patient who developed jaundice during carbarsone treatment.

In the authors' opinion the mechanisms of carbarsone toxicity in these cases were: hypersensitivity to the drug; excessive dosage (24 cases); and toxicity of the samples of drug used (19 cases) due to arsanilic acid contamination. They consider carbarsone an effective adjuvant in amoebicidal treatment and relatively safe if properly manufactured and stored. The dose should not exceed 0·25 gm. thrice daily for 10 days for normal adult males; it should be reduced for smaller patients. A course of treatment should not be repeated without an interval of 10 days. BAL should be given at once and in full dosage on the appearance of toxic manifestations. *A. R. D. Adams*

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Krishnaswami, K. V. & Vaidyanathan, N. **Clinical Trial of a New Drug in Amoebic Dysentery.** *J. Indian Med. Ass.* 1957, Sept. 1, v. 29, No. 5, 187–91.

Camoform [biallylamicol] is put up in 250 mgm. tablets; the advocated dosage is 1 or 2 tablets thrice daily for 5 days. 20 patients in Madras with parasitologically proven intestinal amoebiasis were treated with 4 to 15 gm. of camoform; 15 of them "showed marked improvement", and 5 showed none. None of 15 "relapsed" within a limited period of observation; in all these 15 cases parasites had disappeared from the stool during the treatment, and 7 of them remained under observation for 2 to 14 months after it.

[See this *Bulletin*, 1956, v. 53, 191; 1957, v. 54, 820, 821.]

A. R. D. Adams

Basu Roy, B. & Nandy, K. **A Study with a New Amoebicidal Drug.** *J. Indian Med. Ass.* 1957, Sept. 1, v. 29, No. 5, 191–4.

Camoform [biallylamicol] was given as a sole amoebicide to 16 adult patients in Calcutta with amoebiasis and suffering from various symptoms ascribed to it. All were diagnosed parasitologically. All were treated for 5 consecutive days; 2 of them had some further camoform treatment thereafter. The dosage ranged from a total of 6·5 gm. to 10·5 gm., the usual being 7·5 gm. The relevant data are set out in a table. Daily stool examinations were done throughout treatment, and these examinations were repeated "at intervals after the course" in all cases for one month and in 4 cases for 2 months. The stools were free from parasites in all cases by the third day of treatment and remained so; symptomatic relief was rapid and complete. These results in 16 patients are considered to be quite encouraging. *A. R. D. Adams*

Bustamente y Rivero, J. M. **Treatment of Amebiasis with Camoform.** *J. Amer. Med. Ass.* 1957, Oct. 19, v. 165, No. 7, 829–30.

The authors, from Peru, refer briefly to the literature on Camoform in the treatment of amoebiasis [see, for example, this *Bulletin*, 1956, v. 53, 1237; 1957, v. 54, 821, 1318]. They then report the treatment with this drug of (1) 39 patients with confirmed chronic amoebic dysentery, (2) one patient with proved pulmonary amoebiasis and (3) 22 patients diagnosed as having amoebiasis on clinical grounds only.

The dosage of Camoform was 250 to 500 mgm. thrice daily, with meals, for 5 days. In all patients symptomatic cure persisted for the "several months" of observation and all became free of *E. histolytica* after one course of treatment and there were "no immediate relapses". The drug had a pronounced effect on several other intestinal protozoa which were significantly reduced. Treatment of the patient with pulmonary amoebiasis resulted in rapid termination of symptoms and radiological and parasitological cure.

The drug was well tolerated by most of the patients: a few had occasional gastro-intestinal disturbances but these were not severe enough to merit discontinuance of treatment. *H. J. O'D. Burke-Gaffney*

Foll, C. V. **Entamide Trial in Chauk, Upper Burma.** *J. Trop. Med. & Hyg.* 1957, Sept., v. 60, No. 9, 216–17.

55 employees in an oilfield in Upper Burma, where amoebiasis—usually asymptomatic—is rife, were treated orally for the infection with Entamide (dichloroacet-4-hydroxy-n-methylanilide) [this *Bulletin*, 1956, v. 53, 995]. The dosage ranged from 20 to 56 mgm. per kgm. daily for 10 days. Stools were examined at the beginning and at the end of treatment, and in all but one case examinations [? monthly] were repeated for periods up to 6 months. 39 of the 54 so re-examined had had parasitic relapses by this time. Toxic side-effects of the treatment were negligible. The possibility of a 12% reinfection rate must be entertained.

A. R. D. Adams

Ruiz Sanchez, F., Ruiz Sanchez, A., Luis Cham, J. & Naranjo Granda, E. **Treatment of Chronic Amebiasis with Oxytetracycline and Tetracycline.** *Antibiotic Med.* New York. 1957, Aug., v. 4, No. 8, 460–64, 1 fig. [16 refs.]

Of 130 patients in Mexico, ranging in age from 5 to 55 years, with chronic amoebiasis which was diagnosed microscopically, half were treated for the condition with oxytetracycline [Terramycin] and the other half with tetracycline [Achromycin]. The dosage of either drug was 15 to 30 mgm./kgm. daily, given for 8 days, by mouth. The stools of all were cleared of parasites by the sixth day of the treatment. Oxytetracycline

achieved this result rather more rapidly than did tetracycline. Pharmacological studies suggest that oxytetracycline is less well absorbed from the gut than is tetracycline—which may explain the difference in rapidity of action. The bigger doses of either drug resulted in a more rapid disappearance of parasites than did the lesser. Parasitic relapses after treatment with either drug were the same (26%) on re-examination after a month; beyond this period follow-up was not feasible in an adequate number of cases. *A. R. D. Adams*

Mousa, A. H., Iskander, M., Sinna, H. A., Basaly, M., Mahdy, M. A., El Seify, F., Amin, N. & El Dynasory, M. **Amoebicidals and their Effect on Human Nutrition. (A Preliminary Report.)** *J. Egyptian Med. Ass.* 1957, v. 40, No. 5, 285–95, 2 charts.

Therapeutic amoebicides differ in their amoebicidal activity *in vivo* and *in vitro*. Their action is on both the parasite and its non-pathogenic bacterial associates. Clinical evidence of vitamin deficiency is sometimes found after prolonged amoebicidal treatment as a result of modification of the intestinal bacterial content. The nutritional changes which follow amoebicidal treatment therefore were deemed worthy of study. 85 patients were examined clinically, biochemically and bacteriologically during and after amoebicidal treatment. The authors have satisfied themselves that fears of malnutrition due to amoebicidal treatment are ill-founded. *A. R. D. Adams*

Rosenberg, J. & Neumann, Edith. **Efficacy of Amodiaquin Hydrochloride (Camoquin Hydrochloride) against Giardiasis.** *Amer. J. Trop. Med. & Hyg.* 1957, July, v. 6, No. 4, 679–80.

"Giardiasis, even when asymptomatic, is a public health problem in hospital personnel. With the aim of avoiding the occasional toxic effects of atabrine, amodiaquin was administered in a single dose of 0·6 gm. to 15 adults harboring *Giardia lamblia*, resulting in the cure of only 5, or 33 per cent."

Browne, S. G. Un cas mortel de dysenterie balantidienne. [**A Fatal Case of** *Balantidium coli* **Dysentery**] *Ann. Soc. Belge de Méd. Trop.* 1957, June 30, v. 37, No. 3, 341–6, 6 figs. on pl.

The author describes the case of an African child of 3 years from the Eastern Province of the Belgian Congo who was admitted to hospital seriously ill with a severe dysentery and anaemia. Many active forms of *Balantidium coli* were found in the stools, together with a number of helminth eggs. *Plasmodium falciparum* was found in the blood during

a febrile period. There was no history of contact with pigs or of dysentery in the neighbourhood. Despite many forms of therapy the child died in a month.

The pathological and histological features are described at length. Predominant were small haemorrhages in the subperitoneal surfaces of the ileum and colon, especially in the caecal and sigmoid regions. The haemorrhages were also present in the mucous and submucous coats, and attached to the mucous surface were masses of bloodstained mucus which, when they were removed, revealed the presence of several small ulcers. Trophozoites of *Balantidium coli* were found in mucus from the caecum, sigmoid and rectum and cysts from the caecum and splenic flexure. In mucus occupying an area of about 2 square cm. in the rectum 24 active trophozoites were found.

The source of the infection was not traced, but parasites resembling *Balantidium coli* were found in the intestines of 2 of 27 rats from the neighbourhood. *H. J. O'D. Burke-Gaffney*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Ordman, D. **Relapsing Fever in Africa.** *Central African J. of Med.* 1957, Sept., v. 3, No. 9, 347–56, 2 figs. [Numerous refs.]

This paper gives a useful summary of the present information concerning relapsing fever in Africa accompanied by two maps illustrating respectively the distribution of louse-borne and tick-borne varieties.

The indigenous people in certain parts of Africa seem to have acquired by experience the method of producing immunity to tick fever by repeated mild infections, and for this purpose carry their own ticks with them when travelling in non-endemic areas. The control of louse-borne relapsing fever depends essentially on improved hygienic and social conditions leading to the extermination of lice. The application of DDT to infested persons and contacts readily stops the spread of the disease and in the case of tick-borne relapsing fever Gammexane was found to be the most satisfactory insecticide for the destruction of ticks. A mixture of 5% Gammexane and 95% sawdust was used in Northern Rhodesia, sprinkled at the base of all internal walls of infested houses and carried across the doorways. The mixture was allowed to remain for 3 weeks and of 1,500 houses treated in this way only 4% required a second treatment. The cases of relapsing fever were reduced from 306 in 1947 to 7 in 1952. Similar results in the destruction of ticks by this drug have been recorded from other parts of Africa and it would seem to be the most efficient and cheap insecticide for the purpose.

There is a lengthy list of outbreaks of relapsing fever and notes on the vectors in a large number of areas in 5 geographical regions of Africa. A selected bibliography has been chosen from nearly 200 references consulted. *Edward Hindle*

Ranque, J., Depieds, R. & Faure, A. Recherches des immobilisines antitréponémiques dans les spirochétoses à *Borrelia hispanica*. [**Studies on Treponemal Immobilization in** *Spirochaeta hispanica* **Infection**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3. 360–62.

The authors had previously shown that no treponemal immobilization occurred in sera from guineapigs 10 days after the appearance in the blood of *Spirochaeta hispanica* with which they had been infected [this *Bulletin*, 1956, v. 53, 451]. They have now been able to stabilize the virulence of the spirochaete and so to obtain longer survival of the inoculated animals.

In the present paper they tabulate the results of Nelson, Kahn and VDRL tests in 31 guineapigs tested at intervals of 24 to 266 days (mean $2\frac{1}{2}$ months) after inoculation with *Sp. hispanica*. In no case was a positive immobilization test (50% or above) obtained and all but one gave an immobilization result of 20% or less, which is well in the negative range.

The Kahn and Kline tests, singly or together, were from + to + + + + in all but 10 of the 31 animals. The specificity of the immobilization test and the frequency of false positive results with the other serological tests in tropical conditions are underlined by these results.

H. J. O'D. Burke-Gaffney

YAWS AND OTHER TREPONEMATOSES

Prabhakar, D. R. **Incidence of Yaws-Like Lesions in Uttar Pradesh.** *J. Indian Med. Ass.* 1957, Sept. 16, v. 29, No. 6, 226–8.

Granulomatous (? framboesial) and ulcerative skin lesions, with osteoperiostitis, were commonly encountered in a VD clinic in the Mirzapur District of Uttar Pradesh (formerly the United Provinces) in India. The overall incidence of these lesions in a population of 25,361 was 5·1%; it was possible to group the many village communities in an ascending order of incidence, from 0·13 to 16·65%. It was noticed that, in communities having a low incidence of the disease, the proportion of those having active granulomas or ulceration, compared with those having only late or healed lesions, was 2:1; in communities in which the total

incidence was high, the ratio of active to healed lesions was lower—0·41–0·64 : 1. [Assuming that the granulomatous and ulcerative lesions, together with a rarer maculo-papular eruption, represent the dermal lesions of secondary yaws, this suggests to the abstracter that the disease was rapidly spreading in communities hitherto free from it, a remarkable phenomenon in the present age.]

The lesions were classified in 3 groups. The first or earliest included "granulomatous nodules", fine papular eruptions, pain and tenderness of bones and joints, pyrexia and swelling of the regional lymph nodes, palmar and plantar hyperkeratosis, condylomata and "framboesial lesions". [The distinction between "granulomata" and "framboesial lesions" is not explained.] Later active lesions constituted the second group, which included gummatous swellings, desquamating lesions and various types of ulceration, mainly on the lower limbs, with hyperostosis. The third or late group displayed hyperpigmentation, shining scars and stabilized bony deformities. [This classification, if the condition be accepted as yaws, creates an artificial distinction between active tertiary skin and bone lesions and similar lesions which happen to have healed.]

Granulomatous nodules of the skin constituted 71·5% of all the lesions noted, while inflammation of bones and joints (10%), ulcerative skin lesions (10·5%) and established bony deformities (10·9%) were much less frequent. [This disproportionate frequency of early lesions again suggests that the disease is of recent introduction, which is difficult to accept.]

The proportionate distribution of the types of lesions varied with age. While lesions of the first group were "quite common" in the 0–10 age-group, in which the incidence is stated to have been 40·6%, they were also far from uncommon in later groups, incidences of 22·8, 14·8, and 14·8 being recorded in the 11–20, 21–30 and 31–40 age-groups respectively. The incidence rates of lesions of the second or "late active group" in the same age-groups are given as 5·3, 21·1, 40·4 and 21·2% respectively. Similar figures for the third or "late healed" group are recorded as 28·6, 14·3, 18·2 and 14·4 respectively. [The table (No. 3) from which these figures have been abstracted, however, appears neither to represent the incidence of the various types of lesion in a representative cross-section of the population, nor their distribution by age-groups in a random selection of 150 patients, as the caption states, since in no age-group do the figures add up to 100%. The inference seems to be that early manifestations of the disease, while most common in the first decade of life, are yet to be found quite commonly in persons between the ages of 11 and 40.]

[This paper is somewhat confusing. Lack of definition of the descriptive terms employed, and absence of illustrations from which their meaning might be determined, greatly impede the reader's grasp of the author's meaning. It would appear that a yaws-like disease is common in some villages of Uttar Pradesh, and that it may be of recent introduction. The abstracter finds this difficult to comprehend.]

J. H. Walters

Furtado, T. A. **Late Manifestations of Yaws.** *Arch. Dermat.* 1957, Oct., v. 76, No. 4, 446–51, 7 figs.

The author records observations based on the intensive study of 121 cases of yaws in Brazil. Late cutaneous lesions were found as follows:—ulcerative lesions 80·9%, keratodermia palmaris et plantaris 25·6%, tuberous and nodular lesions 7·4%, gangosa 3·3%. No juxta-articular nodules were found. The tuberous, nodular and ulcerative lesions were located in 95·1% of patients in the lower limbs and a predilection for the left leg was observed. It is suggested that this may be due to its slower venous circulation. Skeletal involvement was found in 39·6% on clinical examination but 76% showed periosteal deposits or periostosis on X-ray examination. Characteristic clinical and radiological lesions are illustrated.

Microscopic examination of the late cutaneous lesions revealed a granulomatous infiltrate rarely containing epithelioid or giant cells. On rare occasions areas of necrosis were found but these differed from the coagulation necrosis of syphilis or the caseation of tuberculosis. No *Treponema pertenue* were demonstrated.

The author found that potassium iodide and mercurial compounds had a therapeutic action on the late cutaneous lesions but agrees that penicillin and other antibiotics are preferable. *Frederick J. Wright*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Worsfold, J. T. **A Survey of Leprosy amongst the Lovale Tribe in the Upper Zambesi Basin, Northern Rhodesia.** *Central African J. of Med.* 1957, Sept. & Oct., v. 3, Nos. 9 & 10, 359–63; 401–6, 11 figs. [19 refs.]

An account is given of a health survey in the upper Zambesi basin of N. Rhodesia with special reference to an epidemiological study of leprosy. The primitive social and health conditions of the people are first described. The people have no inhibitions regarding leprosy, and after gaining their confidence there was no difficulty in carrying out the survey which lasted 5 months and included the total population. The minimal epidemiological data of the Madrid Congress were used as a model.

In the population of 20,148 the cases of leprosy were 240 (11·85 per 1,000). The sex distribution is of particular interest, as despite the fact that the males of the total population are 824 fewer than the females, the

females with leprosy exceed the males by 26. Up to the age of 29 there are 14 males with leprosy compared with only 5 females, but in the next 3 decades there are 95 females and only 55 males. This is due to the males leaving the district and going off in search of employment and adventure.

66% of leprosy patients had a near relative with the disease; in 63 of them the infective relative was an uncle or aunt, and in only 44 was it a parent. This was considered to be due to the promiscuous mode of life. The type prevalence was tuberculoid 60·84%, lepromatous 23·75%, indeterminate 13·75% and borderline 1·66%. In 46·3% there was clinical nerve involvement, and the onset of the disease is seldom acute or subacute.

"Since 1950 some 2,401 patients at Chitokoloki Leprosy Settlement have received oral diamino-diphenyl sulphone and, in general, the results of treatment have been excellent." The clinical picture has been complicated in some cases by poor nutrition, possibly liver damage, and intercurrent infections." *Ernest Muir*

Mukerjee, N. & Ghosal, P. **Study of Cutaneous Nerve in Leprosy by Acid Phosphatase Method.** *Leprosy in India.* 1957, Jan., v. 29, No. 1, 3–13, 10 figs. [11 refs.]

Using the acid phosphatase method, the technique of which is described, and superstaining with Ziehl-Neelsen stain, the authors stained cutaneous nerves in cases of tuberculoid leprosy and nerves in lepromatous cases. To ascertain the position of lepra bacilli in cutaneous nerves, sections from 10 lepromatous and 4 tuberculoid cases were made. In tuberculoid sections a few bacilli but no globi were found. The bacilli appeared to lie in the spaces between the nerve fibres. None were found inside the nerve fibres. In lepromatous sections large numbers of bacilli were found inside the nerves. There were globi, and the majority of bacilli appeared to lie in the spaces between the fibres, though some were in Schwann cells, or under the Schwann sheath. A few were within the myelin sheath, several within the unstained circumscribed swelling of the axon and a few within the axon, but the axon was very faintly stained.

Pathological changes in the nerves themselves are also described and illustrated.

[See also this *Bulletin*, 1956, v. 53, 323.] *Ernest Muir*

Chatterjee, K. R., Ray, H. N. & Mukerjee, N. **Histological Studies of Skin Lesions in Lepromatous Leprosy.** *Indian J. Med. Sci.* 1957, Sept., v. 11, No. 9, 714–16.

It is generally supposed that the lipoid found in the foamy cells of lepromatous leprosy is the product of degeneration of phagocytosed leprosy bacilli. The authors used various cytochemical techniques but these

could show no sign of degeneration in the lepra bacilli. The foam cells, however, were found to be degenerated, and lipoid was the end product of this degeneration. Bacilli are engulfed by fresh macrophages and the latter again degenerate, while the bacilli flourish on the lipids, calcium, polysaccharides and phosphorus supplied by the cell. It is suggested that the presence of calcium may indicate an attempt to limit the spread of bacilli, but in the case of leprosy calcium combines with lipids and is used in the metabolism of the organism to promote its growth and multiplication. The various techniques used are briefly described. Alkaline phosphatase was found in the nuclei of cells, nerve fibres, and in the endothelial lining of blood vessels, where the bacilli were present in large numbers. Polysaccharides were concentrated most where bacilli were present in large numbers.

A similarity in cytochemical reactions in the macrophage cells and the leprosy bacillus was striking, and suggests a similar type of metabolism in their respective physiological processes. *Ernest Muir*

de Grauwe, J. & Verdin, G. L'intérêt de la biopsie cutanée dans le diagnostic de la lèpre et le contrôle des résultats thérapeutiques. Quelques considérations sur l'évolution de la lèpre traitée. [**The Importance of Cutaneous Biopsy in the Diagnosis of Leprosy and the Control of Therapeutic Results. Some Reflections on the Evolution of Leprosy under Treatment**] *Ann. Soc. Belge de Méd. Trop.* 1957, Aug. 31, v. 37, No. 4, 443–57.

The objects of the enquiry were: (a) to estimate the value of skin biopsies as an aid to diagnosis and classification in early untreated cases of leprosy or suspected leprosy; (b) to observe the progress under treatment; (c) to trace the later course under treatment of slight suspected lesions; and (d) note changes from one type of leprosy to another. In 18% of patients in whom the clinical and bacteriological results were positive for leprosy the biopsy gave negative results, but this called for further biopsies in other skin sites. The disappearance of cutaneous and neural signs does not necessarily indicate complete healing; of 51 clinically negative cases 13·9% were shown positive by biopsy. Most clinical suspects were proved by biopsy to be indeterminate cases; the early diagnosis of such patients is very important as they heal up promptly under treatment.

In a table it is shown how various types of leprosy may change into other types; out of 42 cases of the tuberculoid type 14 became indeterminate during treatment. It is emphasized that even the slightest suspected batches should be biopsied and patients kept under observation.

A further section of the paper deals with results obtained under treatment with DDS suspended in chaulmoogra esters over periods up to 9 months, and certain complications and side-effects are detailed. The conclusion is that biopsies are of great value in the early diagnosis of

early suspect cases of leprosy, and in assessing improvement under treatment. *Ernest Muir*

Camain, R., Kerbastard, P. & Devaux, J. Ponctions biopsies hépatiques chez des lépreux non traités et des "contacts de lépreux". [**Puncture Biopsies of the Liver in Untreated Leprosy Patients and in Leprosy Contacts**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 351–5, 4 figs. on 2 pls.

The authors examined liver puncture material from 81 untreated leprosy patients. Of these 37 were lepromatous, 41 tuberculoid and 3 undifferentiated. They found, on histological examination, lesions in 35 of the first, 13 of the second and in 1 of the third. In the lepromatous type the lesion took the form of a nodule. The vacuolated Virchow cells were comparatively more numerous compared with lesions of the skin, and the lymphocytes and unvacuolated histiocytes were less numerous. The authors were able to note places where 2 or 3 vacuolated Küpffer cells were so modified that they had obliterated the capillary and were pressing aside the neighbouring hepatic cells. In this type of lesion the lepra bacilli inside the histiocytes were very numerous, and the appearance was very similar to that in the skin. Later, fibroblasts might invade the nodule and fibrous tissue take the place of the Virchow cells. In tuberculoid cases there were at first condensations of lymphocytes and histiocytes in the portal spaces or in the lobules, but neutrophils were much less common than in early tuberculous lesions. As the lesion grew larger it took on a follicular appearance very similar to that in tuberculosis. Giant cells were not common, but instead, a fibrous evolution took place. Lepra bacilli were extremely rare.

In undifferentiated cases there was no specific picture in the liver.

To ascertain early histological appearances in the liver, punctures were made of 20 children of leprous parents who had lived in contact with their parents. In 19 of these the histological picture was normal, but in a baby of 2 years of age a tuberculoid follicle was found identical with those found after inoculation with BCG. On re-examination clinically an undifferentiated lesion was found between the eyebrows, 7 mm. in diameter. It is suggested that bacilli, in addition to entering the body by penetrating the skin, may also enter through the digestive tract.

Ernest Muir

Olitzki, A. L. & Sagher, F. **Kahn's Universal Reaction in Leprosy.** Reprinted from *J. Investigative Dermat.* 1956, July, v. 27, No. 1, 35–42, 4 figs.

There has been a good deal of disagreement about the effect of leprosy on Kahn's universal reaction [this *Bulletin*, 1953, v. 50, 1143; 1954, v. 51, 804].

These authors repeatedly carried out this reaction on 27 patients with lepromatous or non-characteristic leprosy who were treated with sulphones over a period of 3 years. 6 patients, 4 of whom showed clinical improvement, gave reactions strongly positive in Zone I, less so in Zone III and still less so in Zone II. 15 patients in a second series showed slightly positive reactions in Zones I and III (only after 4–24 hours) and negative reactions in Zone II; all of these except 4 showed considerable clinical improvement and Wasserman and Kahn reactions generally became negative. A third series of 6 patients had weakly positive curves before treatment which became still weaker and more delayed; 4 showed considerable improvement and Wassermann and Kahn reactions all became negative.

It is concluded that the asymmetrical curve tends to appear early when improvement occurs under treatment. *T. E. Osmond*

Collier, W. A., Bueno de Mesquita, S. J. & Van Zanten, E. Kwantitatieve complementbinding en leprominereactie bij tuberculose. [**Quantitative Complement-Fixation and Lepromin Test in Tuberculosis**] *Nederl. Tijdschr. v. Geneesk.* 1957, Nov. 2, v. 101, No. 44. 2057–63, 4 figs.

The English summary appended to the paper is as follows:—

"In a lepra-endemic environment the quantitative complement fixation test with the Essen antigen was performed in 122 cases of tuberculosis, control tests being done on 219 patients suffering from leprosy (L_I, L_{II} and L_{III}) and on 52 healthy subjects who had recently arrived from Europe. Of the 122 tuberculous patients, 20 per cent. had a negative test, 34 per cent. a positive test, while a severe reaction was seen in 46 per cent. of these cases. Corresponding figures for the 219 leprosy cases were 14, 19 and 67 per cent. Of the 52 healthy persons 94 per cent. were nonreactors, and only 6 per cent. of the tests were positive.

"The Fernandez test was negative in 20 per cent. of all tuberculosis cases and in 61 per cent. of the leprosy cases; percentages for the Mitsuda test were 10 and 79 respectively. A 3 + reaction to the Mitsuda test occurred in 41 per cent. of the tuberculous patients. Further investigation is required to assess the value of the Mitsuda test for tuberculosis in an environment where leprosy does not occur.

"The connection between the results of the Mantoux and Fernandez tests is not quite clear. In tuberculous patients, however, there is a certain correlation between Mantoux reactions of 20 mm and over and the titre of the complement fixation, for patients with a high antibody titre tend to have a severe Mantoux reaction. A similar connection may be found between the Mantoux and Mitsuda tests." [See this *Bulletin*, 1957, v. 54, 1087.]

Roy, A. N. & Banerjee, Gouri. **Correlation between Haemagglutination Reaction and Tuberculin Skin Sensitivity in Leprosy.** *Ann. Biochem. & Exper. Med.* Calcutta. 1957, v. 17, No. 4, 111–16. [12 refs.]

In search of a less cumbersome method of diagnosis, when leprosy bacilli cannot be found by routine methods, the authors investigated the possibility of correlation between haemagglutination reaction and tuberculin sensitivity in leprosy. Using a modification of the method of Middlebrook and Dubos they tested the sera of 132 lepromatous patients, 84 of whom had been found bacteriologically positive and 48 negative. Of the positives 79, and of the negatives 42, showed presence of antibodies in titres ranging from 1 in 2 to 1 in 256. It is shown in tabular form that of the 78 of these patients who were put to the Mantoux test: 47 bacteriologically positive cases showed 20 with positive haemagglutination and Mantoux, 22 with haemagglutination positive and Mantoux negative, 2 with haemagglutination below 1 in 8 and Mantoux negative, and 3 with haemagglutination negative and Mantoux positive. Of the 31 bacteriologically negative patients only 8 were haemagglutination and Mantoux positive, the remaining 23 having them both negative. There is thus no correlation between the haemagglutination reaction and skin sensitivity to tuberculin in patients with clinical leprosy.

Out of 60 healthy controls only 1 showed a positive haemagglutination reaction. *Ernest Muir*

Bergel, M. Inoculación del *Mycobacterium leprae* a ratas alimentadas con dietas prooxidantes. I.—Resultados bacteriológicos hasta los siete meses de la inoculación. [**Inoculation of *Myco. leprae* in Rats fed on Prooxidant Diet. I.—Bacteriological Results up to Seven Months after Inoculation**] *Semana Méd.* 1957, Sept. 5, v. 111, No. 10, 479–87, 13 figs. English summary.

The object of the experiment was to show whether rats fed on prooxidant diet, that is a diet low in vitamin E and containing 15% linseed oil, would when inoculated with *Myco. leprae* show growth of the bacilli; or at least show if the bacilli would lose their characteristics and behave differently from the same bacilli inoculated into rats fed on ordinary diet.

30 rats were inoculated with a suspension of bacilli, intraperitoneally, intratesticularly and subcutaneously. Of these 21 were fed on the special diet consisting of casein 23·8 gm., malt yeast 8·9 gm., mineral salts 3 gm., starch 48·9 gm., and linseed oil 15·5 gm. The control group of 9 rats were given an ordinary mixed diet. Of the rats on the special diet 7 were killed at intervals of 28 to 201 days; while 6 others were found dead at intervals of 166 to 207 days. The control rats were killed at intervals of 28 to 120 days. The rest of the animals remained alive.

Descriptions of each rat examined are given along with histological details and illustrated with photomicrographs. In the experimental rats it was found that the testicles had shrunk and that there was scarcely any fat in the body. The inoculated bacilli at first became granular in appearance and diminished in numbers. Later they appeared again to increase in number and produced homogeneous bacilli in small and middle-sized globi. This is explained either on the supposition that the bacilli had to become granular before they could reproduce themselves, or that the conditions became more favourable for their multiplication some time after inoculation. Compared with the experimental rats the control rats showed completely different appearances, the bacilli being almost entirely reduced to granules within the first 4 months after inoculation. Those experimental rats which were given in addition silver nitrate in their drinking water showed enormous richness of bacilli, especially in one animal.

While the authors acknowledge that the experiment is inconclusive as to multiplication of bacilli after only 7 months, because of the small number of rats used, they hope to be able to establish their contention at the end of their series of experiments. *Ernest Muir*

HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:—*Trematodes *(schistosomes, other flukes);* Cestodes *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* Nematodes *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

Gonzales-Mugaburu, L. & Parra, Bertha. Nota sobre hallazgo de algunos helmintos en la vicuña (*Vicugna vicugna*). [**Note on Some Helminths found in the Vicuña**] *Rev. Med. Exper.* Lima. 1956. Dec., v. 10, No. 2, 153–4.

The English summary appended to the paper is as follows:—

"The authors report for the first time the presence of *Fasciola hepatica*, hydatid cyst, *Oesophagostomum venulosum*, *Trichuris ovis* and *Chabertia ovina* from the vicuña (*Vicugna vicugna*), which becomes a new host for the above mentioned parasites."

[The vicuña is a wild ruminant allied to the llama and found in Peru and Chile.]

Tredre, R. F. **Schistosomiasis or Bilharziasis.** Reprinted from *Chemistry & Indust.* 1957, Aug. 24, 1138–43, 6 figs. [10 refs.]

The author of this paper believes that human schistosome infections are always pathogenic, irrespective of the intensity of infection. The

ineffectiveness of present methods of attack on schistosomiasis is due to lack of success in the earlier attempts at control, previous lack of interest in snail research and of skilled research workers in this field, so that " in schistosomiasis progress lags behind that of malaria by at least 20–25 years ". Increased interest in snail research could improve preventive measures so that in 20 years' time they would be as efficient as the present methods of malaria control.

This paper was read to an audience primarily non-medical and it gives a concise picture of the geographical distribution of schistosomiasis, its parasitology, clinical effects and control. It emphasizes the importance of man/snail contact points and of molluscicidal treatment of these points. Diagrams illustrate the likely contact points around villages and in irrigation systems. *T. H. Davey*

Alves, W. **Bilharziasis in Africa. A Review.** *Central African J. of Med.* 1957, Apr., v. 3, No. 4, 123–7, 1 fig.

To write a review of schistosomiasis in Africa and keep it within a space of 5 pages would seem to be a very ambitious undertaking, yet the author has succeeded in presenting a thumb-nail sketch of the subject which is readable and informative.

Dealing first with *S. haematobium* he discusses its distribution in terms of regions, beginning with British East African territories and passing down through Mozambique to the Union. The incidence and importance of the infection in each region are discussed. Infections with *S. mansoni* are dealt with summarily as " statistics of these infections can be even more misleading than those of *S. haematobium* ".

The intermediate hosts (" this highly specialised and still controversial aspect of bilharziasis ") are mentioned briefly. Stress is laid, however, on an interesting and important outcome of irrigation schemes in S. Rhodesia, namely, " the truly frightening increase in actual numbers of all snails " and a reversal of the pattern in natural waters in regard to the incidence of *Biomphalaria*, which in irrigation furrows and storage dams outnumbers the other kinds of snails.

The review concludes with a stern warning of the consequences, if the dangers inherent in irrigation farming in Africa are not reduced, and a plea to the irrigation and construction engineers, the agriculturalists, the pasturalists and the " openers-up " generally to exploit the eagerness of public health workers to advise and cooperate. *J. J. C. Buckley*

Buttner, Alice & Bourcart, Nicole. Étude des facteurs épidémiologiques qui président à la création d'un foyer de bilharziose humaine. Observations faites au Brésil et en Corse. [**Study of Epidemiological Factors affecting the Development of a Focus of Schistosomiasis. Observations made in Brazil and Corsica**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 473–80, 6 figs. on 3 pls.

These authors state the thesis that the probability of schistosomiasis becoming endemic in a locality after introduction depends primarily on the frequency of contact between the vertebrate host and the vector snail. When contact is sporadic the risk is low and when sustained it is considerable. This thesis is supported by epidemiological observations from two places, Fordlandia in the State of Pará, Brazil, and the island of Corsica.

Fordlandia was an area of development in virgin bush. *Australorbis centimetralis* existed in the streams, and the labour force was recruited from north-east Brazil where *Schistosoma mansoni* was highly endemic. Most of the labourers with their families were accommodated in small camps close to the streams on the banks of which they defaecated and in the waters of which they washed and played. The first autochthonous case of schistosomiasis appeared in 1949 and by 1955 30% of the inhabitants were infected.

In Corsica a *Bulinus* vector was present but no indigenous case of *S. haematobium* had been recorded although the snail actively transmits bovine schistosomiasis. The lower parts of the rivers contained *Bulinus* and were frequented by women doing their washing, by children playing, and men fishing. The frequency and duration of contact between man and snail was not at all comparable with that in the Amazon. Moreover, troops from North Africa, who were probably carrying *S. haematobium*, were disposed in the towns and had little opportunity of contaminating *Bulinus* foci. A scheme of development, under consideration, could alter this situation, because the labour force would be largely composed of Africans, some of whom would be infected.

In view of the dependence of schistosomiasis endemicity on contact between man and snail the main control measure recommended is careful screening of prospective employees and prevention of access to the area by infected persons.

[See also this *Bulletin*, 1956, v. 53, 1401.] *T. H. Davey*

Schwetz, J. Sur le réexamen partiel de trois agglomérations congolaises, examinées six ans auparavant au point de vue malacoschistosomique: Bunia et Irumu (Haut-Ituri) et Kasenyi (lac Albert). [**Partial Re-Survey of Incidence of Schistosomiasis and Snail Hosts in Bunia, Irumu and Kasenyi, Belgian Congo**] *Acad. Roy. Sci. Coloniales Bull. des Séances.* Brussels. (n.s.) 1956, v. 2, No. 6, 1084–95, 2 figs.

In 1949 the author investigated 3 foci of schistosomiasis in the Belgian Congo [*Inst. Roy. Colonial Belge. Sect. des Sci. Naturelles et Méd. Mémoires*, 1951, v. 19, No. 5; this *Bulletin*, 1952, v. 49, (1134)] and 6 years later revisited the localities to observe what changes, if any, had taken place in the situation in the meantime. At Bunia and Irumu he

found that although the infection rate in the planorbid snails was still high, in spite of treatment of the people, the infection rate in the people was less than formerly. At Kasenyi, where in 1949 he had seen some cases of hepato-splenomegaly among the fishermen, this condition was no longer to be seen; but the disease is still considered serious, judging from the intensity of infection by microscopic diagnosis. The absence of cases of *gros ventre* is attributed to a new method of catching fish which was introduced in the intervening years, and which reduces exposure to infected water. *J. J. C. Buckley*

McCULLOUGH, F. S. **The Distribution of Human Schistosomiasis and the Potential Snail Hosts in Ghana.** *West African Med. J.* 1957. Sept., v. 6 (n.s.), No. 3, 87–97, 4 maps. [10 refs.]

This is a brief account of the distribution of potential snail vectors of human schistosomiasis in Ghana and of the vesical and intestinal infections. *Bulinus* (*Physopsis*) *globosus* is the most widely distributed snail host and must be the most important vector of *S. haematobium*. *B.* (*Bulinus*) *truncatus rohlfsi* is sparsely distributed in the Northern Territories and the eastern Accra plains. This species has been proved a vector in laboratory experiments but it can be of little importance owing to its restricted distribution, though in one locality it is the only potential vector. *B.* (*B.*) *forskali* is widely distributed in different types of habitats in which its numbers fluctuate markedly. It has not yet been proved that this species is a vector in Ghana. *Biomphalaria pfeifferi gaudi*, the vector of *S. mansoni*, is sparsely distributed in a few foci.

Regarding the distribution of schistosomiasis, the vesical form is largely confined to 2 extensive areas, in the central zone of the Colony and in the north-eastern region of the Northern Territories and in Togoland. Other foci are small and scattered. Local infection rates may be as high as 75% or above. In one focus the only potential vector found was *B.* (*B.*) *forskali*. The incidence of *S. mansoni* in the country generally is very low. Infection exists at Tarkwa (the principal focus), Awabi and a few areas in the Northern Territories such as Wiaga. The Volta River project and its associated irrigation schemes, if undertaken, may encourage breeding of the vector and may spread the disease.

[For previous work by the author and his colleagues, see this *Bulletin*, 1955, v. 52, 169, *bis*, 905, 1102; 1956, v. 53, 455.] *T. H. Davey*

VERDCOURT, B. **Possible Occurrence of Strains in Species of Schistosomes.** [Correspondence.] *Nature*. 1957, Oct. 26, v. 180, 865–6.

CRIDLAND [this *Bulletin*, 1955, v. 52, 797] did not find evidence for the occurrence of strains in human schistosomes. He also found that

some species of snails did not appear to act as carriers: for example, he was not able to infect *Bulinus africanus ovoideus* with *Schistosoma haematobium* in the laboratory, and stated that this snail will not act as a carrier in Uganda.

In the Kitui area of Kenya *B.* (*Physopsis*) *africanus ovoideus* and *B.* (*P.*) *nasutus* both occur in ponds, dams and streams, and the latter snail is also common in the north-east coastal regions of Tanganyika. The present author considers that it is quite different from the snail in the Great Lakes which was recorded as *B.* (*P.*) *nasutus* by Mandal-Barth.

Schistosomiasis is common in the Kitui area and *B.* (*P.*) *africanus ovoideus* has been shown to be a carrier by identification of the adult worms. This suggests that either that snail or *S. haematobium* or both exist in different strains. "It seems more probable that the parasite exhibits strains but the species of *Bulinus* are rather plastic."

H. J. O'D. Burke-Gaffney

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Deschiens, R. Sur la perpétuation des élevages des mollusques vecteurs des bilharzioses à l'obscurité. [**Development of Snail Vectors of Schistosomiasis in the Dark**] *Bull. Soc. Path. Exot.* 1957, Mar.–Apr., v. 50, No. 2, 229–33.

This report describes further experiments relating to the behaviour and development of molluscs subjected to darkness for prolonged periods [see André and Deschiens, *Bull. Soc. Path. Exot.*, 1956, v. 49, 277; and Deschiens and Bijan, this *Bulletin*, 1957, v. 54, 709]. In the present series of experiments two groups of two aquaria were set up under identical conditions of temperature (20–24°C.), water volume, food and aeration except that light was totally excluded from one pair while the other received natural illumination. 20 *Bulinus truncatus* were introduced to each tank. The aquaria were observed under these conditions over a period of one year. During April, May and June the population of the blacked-out tanks was depleted by 40%, egg masses were relatively rare, 50% of the eggs failed to develop and at least 70% of the young that did emerge, died. During the period July–October the adult population maintained its numbers but there was no increase in egg-laying and the egg masses were small. Juvenile mortality was not as great as in the previous period. In the period November–March the adult population remained at 18 and 19 specimens per tank, respectively, owing to the development of juvenile forms. Egg laying was rare, egg patches were very small but did produce juveniles. Although the snail population in these tanks at the end of one year was much the same as at the beginning, the effect of darkness was very marked when compared with the controls. In the latter tanks, development continued unchecked and necessitated the removal of 150–200 specimens. The juvenile mortality rate in the darkened tanks was about 90% compared with 5–10% in the controls.

It is concluded that although *B. truncatus* can maintain its population density in entire darkness, the absence of light has a marked deleterious effect. The author recommends that the establishment of covered drains and waterways in areas where schistosomiasis is endemic would do much to control the density of snail populations but would not exclude the need for molluscicides or control by biological means. *O. D. Standen*

White, P. C., Jr., Pimentel, D. & Garcia, F. C. **Distribution and Prevalence of Human Schistosomiasis in Puerto Rico in 1953.** *Amer. J. Trop. Med. & Hyg.* 1957, July, v. 6, No. 4, 715–26, 1 fig. [12 refs.]

In this survey more than 10,000 schoolchildren between 5 and 18 years of age in different areas of Puerto Rico were examined for *Schistosoma mansoni* by a concentration method. In one school the children sampled were aged 1 to 16 years. The incidence of schistosomiasis in different municipalities ranged from 0 to 29·3% with an average of 10%. The incidence in males was 12·5%, compared with 8·1% in females, and in the former the infection rate was directly correlated with age, probably owing to increased swimming activity as they became older. Infection rates with other helminths were: ankylostomes, 17·1%; *Ascaris lumbricoides*, 20·3%; *Trichuris trichiura*, 92·6%.

In general the incidence of schistosomiasis was directly related to the distribution and abundance of *Australorbis glabratus*, but on two occasions it was not. In one area only 4 infected snails were identified by cercarial emission among 5,185 collected from 116 stations though 27·4% of the human population were infected. The snail numbers varied little during the 6-months' study period but infection rates as revealed by cercarial emission varied considerably. Uninfected *A. glabratus* lived for about a year but highly infected specimens survived only about half that time and the heavily infected a still shorter period. In flat country housing was situated away from the river, human contact with it was less and snail infection rates were low. In the alluvial valleys in the mountains the reverse was true, most of the sewage reached the water and the snails tended to be highly infected. *T. H. Davey*

Ottolina, C. El miracidio del *Schistosoma mansoni*. Anatomía—citología—fisiología. [**The Miracidium of** *Schistosoma mansoni*, **Anatomy, Cytology, Physiology**] *Rev. Sanidad y Asistencia Social.* Caracas. 1957, Jan.–Aug., v. 22, Nos. 1/4, 7–411, 158 figs. & 1 pl. [92 refs.]

This massive monograph, by an author whose work on schistosomiasis has gained a world-wide reputation, is probably the most complete

account of the miracidium in existence, and will be a necessary work of reference to all workers seriously studying the subject.

The first section is devoted to dimensions, movements, longevity and external morphology, and this is followed by a section on internal structure—cephalic glands, flame cells, nutritional and excretory apparatus, and an interpretation of the physiology of these organs. The next section deals with the nervous system, and this is followed by an account of the germinal system.

A very large part of the monograph (155 pages) is occupied by a series of notes, consisting of quotations from the writings of scientists from the time of Bilharz (1852) onwards, and relating to form, movements, longevity and structure.

The monograph ends with 3 appendices, on techniques, vital staining, and anaesthesia, and there is a comprehensive table of contents, and a bibliography of 92 references. The text is enlivened by 158 illustrations, many of them line drawings but many photomicrographs reproduced (in various degrees of clarity) in half-tone. Some of the photographs are excellent, and display shape and detail of internal structure admirably.

Besides the findings of earlier authors, the author has incorporated a considerable amount of his own original work in this monograph, including a series of measurements of various features of the miracidium. He is to be congratulated on the completion of a laborious and valuable work, well produced. *Charles Wilcocks*

Coutinho, A. & Lyra, A. Alguns aspectos do hiperesplenismo na esquistossomíase mansônica. [**Some Aspects of Splenomegaly in *Schistosoma mansoni* Infection**] *Anais Facul. Med. Univ. do Recife.* 1956, Dec., v. 16, No. 2, 245–61. [Numerous refs.]

The following is a translation of the authors' summary:—

Study was made of changes in the blood and bone-marrow occurring in secondary splenomegaly in 20 cases of *Schistosoma mansoni* infection in its hepato-splenic form. The changes in each of the haematopoietic series (erythrocytes, leucocytes and thrombocytes) are described separately and then the 3 series are analysed together.

The predominant finding was a panhaematopenia in the peripheral blood: less frequently observed was a combined decrease of 2 elements, namely anaemia + leucopenia and anaemia + thrombocytopenia.

The anaemia had the following characteristics: moderate or slight intensity, normocytic or macrocytic, normochromic and hyporegenerative, the probable mechanism being an inhibition of the bone-marrow, especially in the emergence of cells. In only 2 cases was an associated haemolytic process observed.

The leucopenia, which was more or less accentuated, involved all the elements except the eosinophils. As regards its probable pathogenesis,

sometimes there were elements suggesting a blockage of the bone-marrow (in maturation or liberation of cells) sometimes suggesting splenic hypersequestration. The decrease of platelets was nearly always of moderate intensity except in a few cases where it was associated with a haemorrhagic syndrome. *H. J. O'D. Burke-Gaffney*

Armbrust, A. F. **Rare Histopathologic Aspects of Manson's Schistosomiasis.** *Amer. J. Trop. Med. & Hyg.* 1957. July, v. 6, No. 4, 731–8, 17 figs. [14 refs.]

Post-mortem studies at the department of pathology of the University of São Paulo, Brazil, have shown the presence of schistosomal lesions which the author has not seen hitherto recorded. The findings in some such cases are described in the text and illustrated by photomicrographs. They include the presence of *Schistosoma mansoni* eggs in the tissues of the thyroid, spleen, lung, pancreas, lower oesophagus and stomach, duodenum, prostate and adrenals. Adult worms were seen within varicose veins in the oesophagus, and inside veins in the spleen and in the pancreas. An egg was found within a large bronchus; another within a Malpighian corpuscle in the spleen; and a ruptured egg and liberated miracidium were observed inside a pulmonary granuloma.

The adult worms probably reached the vessels at the lower end of the oesophagus through the coronary vein of the stomach owing to obstruction of the portal system by cirrhosis. Arterio-venous fistulae in the lungs can provide a passage for eggs into the systemic arterial system, and their distribution through the latter to the viscera. Though there is ready passage through the portal system to the spleen the author has found singularly few records of the presence of eggs or of adult worms in the spleen. In one of his 3 cases of spleen involvement 2 male and a female worm were found in this organ, but in this particular case no eggs were found in association with them. His recovery of eggs in the adrenals is the only record of this that he can trace, though the finding of schistosome eggs in the adrenals is mentioned by Koppisch [this *Bulletin*, 1942, v. 39, 563]. *A. R. D. Adams*

Horrax, G., Ruiz Rodríguez, J. M. & Castillo, R. Lesiones medulares de origen bilharziano. [**Spinal Lesions in Schistosomiasis**] *Gac. Méd. de Caracas.* 1956, June–Sept., v. 64, Nos. 6, 7, 8 & 9, 253–8.

The authors describe a patient aged 16, who developed a Brown-Séquard type of paralysis; laboratory examinations were not helpful but myelography suggested a defect at the level of the 12th dorsal vertebra. Laminectomy, however, did not reveal the cause, but led to temporary improvement. Signs reappeared and another myelogram showed evidence of intraspinal tumour formation at the level of D5; a second

laminectomy confirmed this and histological examination showed that the tumour was schistosomal, eggs and cellular reaction to them being demonstrated. Rectal biopsy was also positive for eggs. Treatment with Fouadin was given, but spastic paraplegia remained.

The authors quote 2 other cases, and discuss the clinical picture, noting that paralysis may be flaccid or spastic. The route by which the eggs are transported to the spine is not certain, though one worker has affirmed that it is the arterial system. The condition is very rare; these 3 cases are said to be all that have been reported from Venezuela.

Charles Wilcocks

Prata, A. TWSb no tratamento da esquistossomose mansônica. Observações em 42 casos. [**TWSb in the Treatment of** *Schistosoma mansoni* **Infection**] *Hospital.* Rio de Janeiro. 1956, Aug., v. 50, No. 2, 259–66.

The English summary appended to the paper is as follows:–

"42 cases of schistosomiasis mansoni were submitted to an intensive treatment with a total dose of 2·0 gm. (0·071–0·025 gm/kg) TWSb. applied in 6 intravenous injections over a period of 36 hours. Out of 38 cases followed up for 4½ to 31 months, 21 cases (55·3%) were presumptive cures, as witnessed by an average of 10 negative feces controls, and, in addition, in 17 cases by a negative rectal biopsy. The tolerance was satisfactory." [See this *Bulletin*, 1955, v. 52, 56.]

Rodrigues da Silva, J. & Veloso, E. A dietilcarbamazina (Hetrazan) e o estanho (Stannoxyl) no tratamento das esquistossomoses. (Estudo de revisão e experiência pessoal.) [**Diethylcarbamazine and Tin Oxide in the Treatment of Schistosomiasis**] *Bol. Centro Estudos Hosp. Servidores Estado.* Rio de Janeiro. 1957, Apr., v. 9, No. 4, 123–34.

The English summary appended to the paper is as follows:–

"The authors study in the present paper the value of diethylcarbamazine (hetrazan) and of tin oxide as Schistosomicidal drugs.

"Six patients with Schistosomiasis mansoni treated with the first drug and five others treated with the latter, did not show either clinical or parasitological evidence of cure or even of improvement."

Deschiens, R., Molinari, V. & Bertrand, D. Sur l'action molluscocide de l'"eau de zinc". [**Molluscicidal Effect of "Zinc Water"**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 59–61.

To determine the effects of "zinc-water" upon *Australorbis glabratus* and *Bulinus contortus* as compared with the presence of granulated zinc

itself in aquarium water, four aquaria were set up. The first contained water filtered from a maceration of granulated zinc (10 gm./litre) that had been standing at 25°C. for 4 days; in the second, granulated zinc was added at the rate of 25 gm./litre. 4 specimens each of *A. glabratus* and *B. contortus* were placed in each tank. The third aquarium contained zinc-water as in the first but goldfish (*Carassius auratus*) were added instead of snails. The fourth aquarium contained fountain water and snails, as a control. The concentration of zinc in the water was determined colorimetrically. The zinc-water contained 1·1 mgm./litre of zinc while the water in the aquarium containing granulated zinc gave a value of 2·2 mgm./litre. It is thought that the zinc may exist in solution as the unstable and strongly ionized hydrocarbonate. In both aquaria the molluscs died in 2–4 days. The fish were unaffected by the zinc-water but the water weeds withered.

Incineration of the snails and subsequent estimation of the zinc content of the ash showed that the tissues of those treated with zinc-water contained 5 times the weight of zinc as did those of the controls. It is concluded that zinc is molluscicidal at a concentration of 10 p.p.m. and that the zinc ions concentrated in the tissues of the molluscs.

O. D. Standen

Deschiens, R. & Molinari, V. Sur l'action molluscocide de la grenaille de zinc. [**Molluscicidal Action of Granulated Zinc**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 62–5.

Further experiments are reported illustrating the molluscicidal action of metallic ions [see above]. In the first series of experiments 5 standard 5-litre aquaria were set up. To each of one pair 20 gm. of granulated zinc were added, one tank containing 6 *Australorbis glabratus* and 6 *Bulinus contortus*, and the other containing goldfish. In another pair the granulated zinc was supplemented by 20 gm. of copper turnings, with the distribution of snails and goldfish as before. The fifth aquarium served as control. The molluscs died within 24 hours. It was noted that on contact with the metal the molluscs retracted within the shell but later became hyperextended. It was determined that ionized zinc at 2·3 mgm./litre was lethal to the molluscs in 24 hours. The goldfish were unaffected.

In the second series the aquaria were arranged in the same manner as the first except that the granulated zinc was substituted by copper turnings and the zinc-copper mixture replaced by brass turnings. In these aquaria the molluscs died within 24 hours.

The mode of molluscicidal action is discussed in terms of the effects of the ionic charge of water containing copper hydroxide and zinc hydroxide. Further, it is suggested that the proximity of metallic copper and zinc sets up galvanic action which may increase the concentration of molluscicidal metallic ions or that the weak electric currents so produced may themselves have a direct action upon the snails. While organic

materials present in natural waters may prove limiting factors in the field, the practical application of these theories should be borne in mind.

O. D. Standen

Coker, C. M. **Effect of Cortisone on Natural Immunity to *Schistosoma mansoni* in Mice.** *Proc. Soc. Exper. Biol. & Med.* 1957, Oct., v. 96, No. 1, 1–3. [11 refs.]

"In 3 separate experiments small groups of mice of 2 strains were exposed to infection with *Schistosoma mansoni* and half of them were treated with cortisone beginning shortly prior to infection and ending on the 29th, 15th and 7th days after infection, respectively. The various regimens of cortisone treatment employed did not increase susceptibility to the parasite, as judged by numbers of adult worms recovered from hepatic portal tracts of the mice 7–8 weeks after infection. The treatments may have enhanced the natural immunity slightly, since significantly fewer worms were recovered from the cortisone-treated mice."

Mao, C. P. **Research in Schistosomiasis japonica in People's China.** *Living Conditions & Health.* London. 1957, v. 1, No. 2, 80–89.

This paper summarizes the results of the main investigations carried out in China on *Schistosoma japonicum* between 1950 and 1956. The material is presented in 5 sections, the first being on epidemiology. In this it is reported that surveys have shown the distribution of the disease in China to be wider than was previously recognized. Research on *Oncomelania* snails has correlated the morphology of the shell with the environment in the breeding places, while anatomical features do not yet serve as a basis for classification. Reports on ecological studies will be of interest to those culturing this snail. They include data on the factors influencing breeding activities and on its growth and food. Observations are made on the sources of contamination of water by ova, the reservoir hosts and the mode of human infection.

In the section on prophylaxis, snail control by agricultural activity, molluscicides and physical and biological measures are described. Interesting observations are made concerning the death of ova in night-soil, which results from the ammonia generated. Protection against cercariae can be effected by repellents or by eliminating them from the water supply by filtration or cercaricides. Experiments in the use of chemoprophylactics are mentioned and there are some observations on immunological studies in animals.

The third section deals with pathology and symptomatology. It is claimed that in persons infected even lightly with schistosomes there is a diminution in working capacity. There are also references to the effects of infection in children and in acute schistosomiasis, to complications of infection and to nervous and ectopic lesions.

In a section on diagnostic methods special attention is paid to intradermal and serological tests. For the former the antigen is the heavily infected liver of a rabbit, an antigen which can be mass-produced. The results are better than by stool examination but pseudoreactions occur in uninfected persons and other fluke infections give positive findings. For serological examinations adult worm antigen is prepared with a modified technique which has greatly improved accuracy. Hatching is regarded as a better diagnostic method than sedimentation and microscopy but neither is good enough by itself.

The fifth section deals with treatment. Potassium antimonyl tartrate is the only drug in general use and the relapse rate varies from 12% to 38% according to age and other factors. The sodium salt was not found less toxic or more effective. A modified dosage schedule has been introduced, the course being 20 instead of 29 days. More intensive treatment schedules are being investigated along with studies on the metabolism of antimony and methods of detoxicating it. New drugs are being synthesized and tested, *e.g.*, ammonium antimonyl gluconate which is being tried clinically. Chinese herb drugs are being used as adjuvants.

[This very concise paper reports the results of a large amount of interesting research in a variety of fields. Many of the matters reported deserve much longer treatment.] *T. H. Davey*

Kuo, Yuan-Hua & Mao, Shou-Pai. **On the Taxonomy of *Oncomelania*—Snail Host of *Schistosoma japonicum*. Morphological Studies of *Oncomelania* Snails from Different Endemic Areas in China.** *Chinese Med. J.* Peking. 1957, Oct., v. 75, No. 10, 824–31, 2 figs. on pl. [10 refs.]

"1. The present article reports the results of observations on the shell characters and the radular ribbon of 327 snails and the nervous system of more than 60 snails collected from sixteen localities in eleven provinces where schistosomiasis japonica prevails.

"2. It is found that the shell color and the operculum design are not specifically characteristic. The number of whorls and shell size vary according to locality, but the variations are so gradual that no clear-cut demarcation line is found. Their taxonomic significance is questionable.

"3. The number of axial ribs on the antepenultimate whorl seems to vary with environmental factors.

"4. The radular pattern varies considerably even in snails of the same area. Most snails have no fixed formula at all. The denticulation formula of the radula is of doubtful value.

"5. The morphology of the nervous system seems identical in all the snails observed. Its taxonomic value is not proved.

"6. It is suggested that for the present the specific term *Oncomelania hupensis* Gredler should be used for all Oncomelania snails involved in the transmission of schistosomiasis japonica in China."

Fang, Ta-Ch'ao, Chang, T'an-Mu & Lü. Fu-Hua. **The Effect of Thyroidectomy and Antithyroid Drugs upon Antimony Potassium Tartrate Toxicity.** *Chinese Med. J.* Peking. 1957, Oct., v. 75, No. 10, 783–91. [27 refs.]

"1. A.p.t. toxicity in experimental animals is decreased by thyroidectomy, antithyroid drugs—thiourea, methylthiouracil, sodium p-aminosalicylate—and intensified by desiccated thyroid and dinitrophenol. The mechanism is thought to be the inhibition of thyroid function and lowering of metabolism.

"2. Antithyroid drugs administered once twenty-four hours previous to a.p.t. can reduce acute a.p.t. toxicity.

"3. In view of the fact that desiccated thyroid enhances the toxicity of antimony, a.p.t. treatment of schistosomiasis patients with hyperthyroidism should be carried out with caution."

Kissel, P. Recrudescence actuelle de la distomatose hépatique en France. Recherche des facteurs qui expliquent cette recrudescence. [**Recrudescence of** *Fasciola hepatica* **Infection in France and Discussion of its Epidemiological Explanation**] *Bull. Acad. Nat. Méd.* 1957, v. 141, Nos. 11/12, 231–4.

A case of human infection with *Fasciola hepatica* in the province of Lorraine, hitherto thought to be free from this infection, is described in detail. Two further cases, in the same family, are recorded. The epidemiology of the infection is discussed and it is concluded that the consumption both of wild and cultivated water cress constitutes a danger to the community. Control measures are suggested. *J. J. C. Buckley*

Bondi, M., Santoro, R. & Savini, R. Studio statistico di cinquanta casi di idatidosi. [**Statistical Study of 50 Cases of Hydatid Infection**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1957, Sept., v. 38, No. 9, 449–64. [10 refs.] English summary.

The cases were seen in Italy.

Vogel, H. Über den *Echinococcus multilocularis* Süddeutschlands. I. Das Bandwurmstadium von Stämmen menschlicher und tierischer Herkunft. [*Echinococcus multilocularis* **in South Germany. I. The Tapeworm Stage of Strains of Human and Animal Origin**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 3, 404–54, 20 figs. [Numerous refs.]

The English summary appended to the paper is as follows:—

"Besides the common hydatid form of human echinococcosis caused

by *Echinococcus granulosus* multilocular or alveolar tumors resembling malignant growths are observed occasionally and only in certain circumscript regions. Leuckart, in 1863, named the parasite responsible for alveolar cases *Echinococcus multilocularis*. Some helminthologists like Dévé and Dew consider *Echinococcus multilocularis* a stray type of *Echinococcus granulosus* due to atypical larval development, whereas Posselt and others have maintained a dualist view and regard the parasites of the two clinical forms as essentially at variance. The experimental studies outlined in this article tend to show that *Echinococcus multilocularis* is a distinct species indeed.

" Two dogs having been fed with parts of *Echinococcus multilocularis* from human cases in Southern Germany developed mature echinococcus tapeworms. By feeding the tapeworm eggs to field-mice (*Microtus arvalis*) multilocular larvae were obtained in turn. Thus, passing through the final host and an intermediate host, the originally human parasite could complete its life cycle three consecutive times under strict control.

" Also other echinococcus strains of free-living and naturally infected animals—foxes and one field-mouse, all from Southern Germany—were kept in laboratory animals. The infection with human or wild animal strains took hold in 11 dogs, 5 cats and 4 foxes as final hosts.

" A detailed morphologic study of numerous tapeworms in all stages, dealing particularly with sexual organs, rostellar hooklets of larval and adult scoleces, body measurements, number of proglottids, leads to the unequivocal conclusion that the wild animal strains belong to the same species as the human strains, i.e. *Echinococcus multilocularis* Leuckart.

" A comparison of *multilocularis* tapeworms with laboratory-raised strobila of *Echinococcus granulosus* from Northern Germany and Yugoslavia revealed manifest differences in body length, absolute and relative size of gravid terminal proglottids, number of segments, shape and size of hooklets, position of genital pore, number and arrangement of testicles, structure of ovary and gravid uterus. As the comparative studies were based on tapeworms raised from human alveolar echinococcus on one side, from porcine hydatids of incontestable origin on the other, their findings are perfectly suited to corroborate and verify the dualist thesis of Posselt. A main point of difference, for instance, is the number of testicles which in *Echinococcus granulosus* is twice as high as in *Echinococcus multilocularis*.

" The various tapeworm stages of *Echinococcus multilocularis* from Southern Germany and of *Echinococcus sibiricensis* Rausch & Schiller, 1954, from Alaska morphologically resemble each other to a degree that they can be judged one single species. However, some dissimilarities in the size of hooklets, host specificity and localization of larvae lend to *Echinococcus sibiricensis* the character of a geographic race or subspecies of the European *Echinococcus multilocularis*.

" Attempts to infect ferrets (*Mustela furio*) and badgers (*Meles meles*) with tapeworms of *Echinococcus multilocularis* proved unsuccessful.

Unlike *Echinococcus granulosus*, *Echinococcus multilocularis* matures not only in dogs but also in cats and foxes. The dog tapeworms are somewhat larger and produce more eggs than those of cats and foxes. In dogs, the tapeworms reach the maximum of development 1½ to 2 months after infection; about the third month a reduction in size, fertility and number of segments is observed."

Sadun, E. H., Norman, L., Allain, D. S. & King, N. M. **Observations on the Susceptibilities of Cotton Rats to *Echinococcus multilocularis* (Leuckart, 1863).** *J. Infect. Dis.* 1957, May–June, v. 100, No. 3. 273–7, 5 figs. [13 refs.]

The authors refer to recent work which has shown that *Echinococcus multilocularis* and *E. granulosus* both occur in North America and that hydatid disease might be an important health risk in Alaska and Canada [this *Bulletin*, 1957, v. 54, 1333]. *E. multilocularis* has been reported in foxes and in microtine rodents in St. Lawrence Island, Alaska, and in wolves and moose in Minnesota. Serological tests being required for the diagnosis of hydatid disease, it was necessary to find suitable laboratory animals for use in the preparation of antigens and antisera.

Echinococcus eggs obtained from naturally infected foxes of St. Lawrence Island, Alaska, were pipetted into the stomachs of cotton mice (*Peromyscus gossypinus*), field mice (*P. polionotus*), deer mice (*P. maniculatus*) and cotton rats (*Sigmodon hispidus*), individual doses varying from 5,000 to 135,000 eggs being given.

All the 18 cotton rats (4 given 12,000 and 14 given 135,000 eggs of *E. multilocularis*) became infected and 15 days after infection the enlarged livers showed vesicles and 6 weeks after infection most of the liver tissue had been destroyed and the infection had spread to the heart, lungs and mesenteries. Two months after infection the livers of the surviving animals weighed half the total weight of the animals themselves. Photographs show the livers of 4 of them.

Of the other animals infected, 4 out of 6 field mice, 4 out of 14 cotton mice and 2 out of 6 deer mice, all given eggs of *E. multilocularis*, became infected; but the livers of 6 white mice, 4 white rats, 3 golden hamsters, 3 guineapigs and 3 rabbits given the same eggs from the same batch of eggs showed no *Echinococcus* cysts on microscopical examination. The authors remark that this failure to infect white mice is surprising, because Vogel [this *Bulletin*, 1955, v. 52, 1208] and Mankau [*ibid.*, 1957, v. 54, 460] reported that white mice are successful intermediate hosts of *E. multilocularis*.

For preliminary serological studies the bentonite flocculation test [Bozicevich *et al.*, *ibid.*, 1952, v. 49, 431; and Sadun and Norman, *ibid.*, 1956, v. 53, 644], originally developed for the diagnosis of trichiniasis, was adapted by the authors. Hydatid fluid obtained from hogs infected

with *E. granulosus* was dialysed against running tapwater in Cellophane sausage casing and then again dialysed against 2 changes of distilled water for 2 hours each time and evaporated to one-third of the original volume, isotonicity being restored by the addition of NaCl. Out of 11 experimentally infected rodents, 4 gave positive reactions with titres of 1 in 10 to 1 in 160, while 12 non-infected rodents gave negative reactions. As controls the authors used the sera of 3 men known to have hydatid infections and those of 8 rabbits artificially immunized with either *E. multilocularis* or *E. granulosus*. All 3 human sera and 7 of the 8 rabbit sera gave positive reactions with titres of 1 in 5 to 1 in 320.

The authors conclude that the cotton rat is highly susceptible to the infection and, being easily bought and reared and satisfactory in size, is very suitable for the study of the larval stages of *E. multilocularis*, but that further studies of human infections are needed to evaluate the bentonite flocculation test. *G. Lapage*

Jeziorańska, Alicja & Dobrowolska, Halina, with the technical assistance of S. Ziębacz. Odczyny immunologiczne przy chorobie bąblowcowej. [**Immunological Reactions in Hydatid Disease**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 139–49. [14 refs.] English summary.

Hydatid cysts obtained from pig livers were dried and ground with saline to form a 1% suspension. This was frozen and thawed several times, left in the cold for 10–14 days and then clarified by centrifugation. After the addition of 0·5% phenol the fluid was used as a complement-fixing antigen for the diagnosis of hydatid disease. Various fractions were also prepared from the dried cysts. A lipid fraction was obtained by alcohol and ether extraction; a polysaccharide fraction by alcohol precipitation from the acidified extract remaining after the lipid extraction; and a protein extract from the residue, which was digested with 0·5% sodium hydroxide solution for 24 hours at room temperature and then acidified to *p*H 4·2 to precipitate the protein fraction; this was purified by reprecipitation at *p*H 4·2 and dried over calcium chloride. The fractions were respectively redissolved in the original volume of saline with 0·5% phenol, as a 1 in 1,000 dilution in saline, and as a 1 in 500 dilution in 0·1 N NaOH followed by neutralization with 0·1 N HCl.

Complement-fixation tests with the sera of normal and immunized rabbits showed that the antigens gave specific fixation; the whole antigen usually gave higher titres than the fractions. Cross-fixation reactions with hydatid and similar antigens prepared from *Ascaris lumbricoides*, *A. suis*, *Taenia saginata* and *Trichinella spiralis* with the corresponding antisera showed specific fixation, and also a considerable degree of cross-fixation indicating the presence of a common antigen. Positive results with hydatid antigen were obtained with 32 of 167 sera from persons suspected of suffering from hydatid disease. In the examination of sera

from 48 persons suffering from unrelated diseases unspecific fixation was obtained in 6 instances when fixation was carried out at 37°C. and in 14 instances with fixation at 4°C. *D. J. Bauer*

Bailenger, J. Fréquence des localisations hydatiques chez l'homme et le bétail. [**Incidence of Hydatid Disease in Different Localizations in Man and Livestock**] *Bull. Soc. Path. Exot.* 1957, Mar.–Apr., v. 50, No. 2, 308–14. [22 refs.]

The author quotes figures, extracted from the reports of previous workers, which suggest that from 1911 to 1951 the proportion of persons with hydatid infection of the lung, as compared with the proportion with liver infection, has steadily increased.

Neither the hypothesis that pulmonary hydatid disease is the result of inhalation of the eggs of *Echinococcus granulosus*, nor the belief that it is the result of the biological evolution of a strain with an affinity for development in lung tissue, can explain this apparent increase. The author considers that the apparent increase is fictitious and is due to increased skill in the recognition of thoracic lesions. Hydatid disease is essentially chronic and statistics of its occurrence in man, when founded on clinical diagnosis, give a distorted picture. The percentages of persons with hydatid infection of the lung or the liver as shown by clinical studies represent the proportion of persons with clinical manifestations of disease in a particular organ and not the proportion of persons actually parasitized in that particular organ.

The author then quotes the results of the 134 post-mortem examinations of hydatid patients which he carried out in the southwest of France during the period 1948 to 1953. These figures show that 49·2% of the autopsies revealed hydatids in the liver, 38·8% in the lung [the figure given in the text is 30·8% but this is an obvious misprint], while the remaining 12% occurred in other organs. *R. M. Gordon*

Di Bello, R. & Venturino, W. Quiste hidático del pericardio. [**Hydatid Cyst of the Pericardium**] *Archivos Uruguayos de Med., Cirug. y Especialidades.* 1957, Mar.–Apr., v. 50, No. 2, 269–84, 11 figs. [26 refs.] English summary.

Report of a symptomless case discovered by X-ray. Operation was successful.

Broughton, M. E. **Hydatid Cyst of the Kidney in a Child.** *Arch. Dis. in Childhood.* 1957, Oct., v. 32, No. 165, 466–8, 3 figs.

"A short survey of the incidence of hydatid disease is given. A case of hydatid cyst of the kidney in a 7-year-old boy is described together

with the relevant investigations and treatment. Certain points arising from the history are discussed."

Biagi F., F., Villa T., S. & Alvarez, G. Nódulos en la submucosa intestinal producidos por *Ancylostoma duodenale* (Dubini, 1843). [**Nodules in the Intestinal Submucosa caused by** *Ancylostoma duodenale*] *Rev. Biologia Trop.* San José, Costa Rica. 1957, July. v. 5, No. 1, 35–43, 10 figs. on 3 pls.

The English summary appended to the paper is as follows:—

"A case is reported of an adult Mexican male who died of heart disease, whose autopsy showed three reddish nodules situated at the level of the intestinal submucosa. In one of the nodules an adult female *Ancylostoma duodenale* was found. Histologically, the nodules were made up of hemorrhagic zones and areas of inflammatory reaction containing eggs and larvae of uncinariae. The presence of eggs within the nodules suggests that hookworms survive there for some time, and points to the possibility of internal autoinfection, as is the case in *Strongyloides stercoralis*."

Brumpt, L. C., Danvoye, Y. & Long Ngeth. Comparaison entre les voies d'administration buccale et rectale de sels ferreux dans le traitement de l'anémie ankylostomique. [**Comparison between the Oral and Rectal Routes in the Administration of Iron Salts in Ankylostome Anaemia**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 75–8, 1 fig.

The authors point out certain unique features which typify the anaemia of ankylostomiasis—the yellowish pallor without the presence of a subicteric tint to the sclerae, cardiac murmurs, progressive thinning of the nails and absence of neuropathy or psychic disturbance. The hypoplastic character of the anaemia is indicated by the reduced blood volume, the microcytosis with isocytosis and target cell formation, and the low percentage of reticulocytes. Studies of serum iron show the lowest levels one can encounter and testify to the exhaustion of the mobile reserves. One should not underestimate the drain on the plasma resources on which depends the hypoproteinaemic oedema.

The intensity of the oedema depends upon the load of parasites, but should an egg output of *Ancylostoma* not exceed 10,000 per gm. of faeces, or output of *Necator*, 5,000 per gm., one should consider that a factor of malnutrition is associated with the infection.

The authors maintain that deworming is an essential preliminary to iron therapy, for they claim to have shown that treatment with iron before the use of a vermifuge is of greater benefit to the worms than to the patient! They therefore prescribe the immediate administration of

tetrachlorethylene in a single dose to the fasting patient, without a subsequent purgative if he is weakened by his anaemia. Active treatment is begun at once, and is confined to the oral administration of an iron salt, for example ferrous sulphate, in a dosage of 1 to 2 gm. a day. Blood transfusions are poorly tolerated, while liver extracts, vitamin B12 and vitamin B group complex are not indicated.

After deworming, the curve of reticulocytosis shows a bell-shaped form, with a zenith of 15 to 25% on the 10th to 13th day. Blood regeneration in children is so rapid that they appear plethoric after 3 weeks, and may suffer headaches, conjunctival injection, vaso-dilatation and acrocyanosis as a result of too rapid an augmentation of the blood volume. While the immediate results of the use of various preparations of iron by the intravenous route are dramatic, the end result is no better than that obtained by oral administration. This route also has the disadvantages of causing nausea, a sensation of heat and sclerosis of the veins.

The authors carried out an experiment on the use of the rectal route, by administering once or twice daily a suppository of 300 mgm. of *d*-dehydroxyferrigluconic acid, which they knew to be well tolerated by mouth. A control subject received 400 mgm. of ferrous sulphate daily by mouth. During a trial period of two weeks, after initial deworming, while the haemoglobin concentration of the control subject rose from 50 to 80%, that of the four experimental subjects remained stationary or declined, while they developed no reticulocytes. The authors conclude that the rectal administration of iron is ineffective.

[This is a good general review of the anaemia in ankylostomiasis, but the insistence on the immediate use of a vermifuge may not gain general support. The authors are so enthusiastic over the results of oral administration of iron salts, that one wonders why they undertook the tiresome and unpromising experiment on rectal administration.] *J. H. Walters*

Soprunov, F. F. & Tendetnick, U. Y. [**An Experiment of Biological Control of Ankylostomiasis in Coal Mines**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26, No. 5, 602–12, 1 chart. [Numerous refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"1. An experiment of ankylostomiasis control in coal mines was conducted by biological method of treatment of the ground for destruction of larvae of ankylostomes.

"2. The total of 410 kg of spores of predacious fungi were brought into the mine which was treated 5 times during the period 1953–1956. 50–100 gm of this preparation was used to 1 square metre of the ground. It was effective for several months and was found to be harmless to man and timbering.

"3. The total incidence of ankylostomiasis was reduced during the period of 1953–1956 from 171 cases to 34 cases (i.e. by 77%).

"4. The reduction of fresh cases preceded the decrease of the incidence of the parasite, which proves the good effect of anti-larval measures (treatment of the ground in the mine by the spores of predacious fungi).

"5. The biological method of ankylostomiasis control investigated has proved to be successful in mines. It is simple, inexpensive and effective. It should be further investigated."

Leikina, E. S., Gefter, V. A. & Zorikhina, V. I. [**Application of Reaction of Agglutination with Carmine for Early Diagnosis of Ascaridiasis in Mass Examination of the Population**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26, No. 5, 612–17. [In Russian.]

The English summary appended to the paper is as follows:—

"Immunological methods of investigations greatly increase the percentage of discovery of the patients with ascaridosis in comparison with the coprological methods. The early diagnosis of this disease, likewise, becomes possible. Reaction of agglutination with carmine, which was tested in mass examination of the population for ascaridosis appeared to be slightly less sensitive, than the reaction of microprecipitation which was elaborated earlier. However, the reaction of agglutination with carmine gave a high percentage of positive results in persons invaded by ascarids (77·2%). The method of this examination is simple and, therefore, justifies recommendation for practical application.

"A physiological saline extract of powdered adult female ascarids (dried at −70°C) may be used as an antigen. The latter is not only very effective but is also quite stable."

Moons, H. Note à propos du traitement de *Larva migrans*. [**Treatment of Larva Migrans**] *Ann. Soc. Belge de Méd. Trop.* 1957, Aug. 31, v. 37, No. 4, 559–60.

The English summary appended to the paper is as follows:—

"Three cases of 'creeping eruption', after having previously been treated without success by refrigeration and electrocoagulation, were healed in a spectacular way by simple application of DDT powder (Neocid Geigy). The scratch lesions are sufficient as entrance for the drug."

Bull. World Health Organization. Geneva. 1957, v. 16, No. 3, 553–664, 1 fig. [Numerous refs.] **Filariasis. Epidemiology—Pathogenesis, Chemotherapy, Vectors—Control.**

The 6 papers abstracted together here are concerned with various aspects of filariasis due to *Wuchereria bancrofti*, and to a lesser extent

W. malayi, in different parts of the world. Other filarial infections are briefly mentioned.

The first paper (*Epidemiology of Filariasis in India*, by N. G. S. Raghavan, pp. 553–579) deals with epidemiology in India where *W. bancrofti* is much more common than *W. malayi*. 80 references are listed and there are 7 annexes tabulating survey findings and showing specimen record sheets. The succeeding paper (*The Distribution of Bancroftian Filariasis in Africa*, by F. Hawking, pp. 581–592) comments on local features of the epidemiology. In contrast to experience elsewhere *Culex fatigans* is generally a poor vector and *Anopheles gambiae* and *A. funestus* are the main insects transmitting the infection. In Egypt the vector, *C. pipiens*, breeds in wells, and control follows provision of piped water and filling in the wells. In Portuguese Guinea elephantiasis of the scrotum is rare while elephantiasis of the legs is common. In East Africa, apart from the coastal zone, there is a high incidence of filariasis east and south of Lake Victoria which decreases with distance from the lake and is absent on the other sides. The factor determining this appears to be mean temperature rather than altitude or rainfall.

A paper on *Filariasis in the Sudan* by R. Kirk (pp. 593–599) summarizes what is known of *W. bancrofti*, *Loa loa* and *Acanthocheilonema* [*Dipetalonema*] *perstans*. The geographical distribution and epidemiology are described as far as they are known. Surveys are needed to explain the occurrence of elephantiasis, lymphadenitis and hydrocele in populations in which *W. bancrofti* is uncommon but other filarial infections are prevalent. The next paper, by H. Galliard (*Outbreak of Filariasis* (*Wuchereria malayi*) *among French and North African Servicemen in North Vietnam*, pp. 601–608), gives an account of the symptoms. It is noted that though the blood may be free from microfilariae these may be found in saline containing lymph gland tissue removed at biopsy. The characteristic syndrome, adenopathy, broncho-pulmonary signs and eosinophilia, was not seen in Vietnam nor has it been described in *W. malayi* areas elsewhere. In Tonking *W. bancrofti* infection occurs; clinical lesions are common and nocturnal periodicity marked. In the area formerly known as Cochin China also a strain is present in the indigenous people which rarely produces lesions and shows little periodicity. It is claimed on these findings that there are 2 biological strains of *W. bancrofti* in Vietnam.

There is a good account by C. Y. Chow of the *Bionomics and Control of Culex pipiens fatigans Wied. in Ceylon* (pp. 609–632) which is the main vector there of *W. bancrofti*. With the control of malaria filariasis has become the most important insect-borne disease on the island. The main breeding places of *C. fatigans* are the catch-pits containing urine, water and sometimes faeces. In laboratory experiments catch-pit water was preferred to ordinary water but if insecticide, particularly dieldrin, was added to the latter it became more attractive. Control of the adult mosquito with residual insecticides is unsatisfactory there because *C.*

fatigans is resistant and in addition it rests mainly on hangings and furniture which are not sprayed. Larvicides in the form of dieldrin or BHC in water emulsion or oil solution proved effective in dosage of 3 to 4 lb. per acre applied weekly.

The paper which follows (*An Effective Programme for the Control of Filariasis in Tahiti*, by J. F. Kessel, pp. 633–664) records the organization and results of a combined attack on *W. bancrofti* in man and on the vectors *Aëdes polynesiensis* and *Culex quinquefasciatus* [*C. fatigans*]. In each area of endemic filariasis decision must be made as a result of blood and mosquito surveys whether to use mass control by diethylcarbamazine or modern methods of vector control, either singly or in combination. Diethylcarbamazine alone is a practical control measure where mosquito control is difficult. Control of *A. polynesiensis* is difficult because of its remarkable adaptability, but it has a limited dispersal range and the habit of breeding in small containers. Sanitary measures applied within the houses and for 100 metres around them controlled breeding satisfactorily. *T. H. Davey*

de Zulueta, J. **Observations on Filariasis in Sarawak and Brunei.** *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 3, 699–705, 1 map.

An extensive malaria survey and control operation in Sarawak and Brunei during 1952–54 yielded much information about the distribution of filariasis in these territories. Nearly 10,000 people were examined, thick blood films being made from alternate persons. It is to be noted that since the films were made only during the daytime the distribution of filarial infections is probably wider than the results indicated.

Two filarial infections were found, *Wuchereria bancrofti* and *W. malayi*. The latter was found as a rule in flat coastal land from which malaria was absent and along the large rivers of Sarawak; it was not recorded in the mountainous interior where malaria was hyperendemic, though it was found in the hilly inland regions of the western divisions. In consequence, the racial groups most affected were the Chinese and Malays of the coastal areas and the Sea Dayak of the western divisions. Malays appeared to be much more subject to *W. malayi* filariasis than Chinese, probably because the latter are more strictly urban. *W. bancrofti* was found only in a few villages in a remote area of the central part of the eastern region of Sarawak. Cases of filariasis were commonly encountered, the more chronic manifestations being more frequent in males.

Nearly 35,000 mosquitoes captured in houses and stable-traps in the Lower Baram were dissected, including more than 5,000 anophelines and more than 22,000 *Mansonia* spp. Among these only one specimen, a *Mansonia*, was found infected with filariae. Among some 5,700 anophelines collected in the *W. bancrofti* endemic area 44 (0·8%) of

5,492 *A. leucosphyrus* were positive for filariae and 4 (1·5%) of 263 *A. barbirostris*; no other mosquitoes were found infected. Of 44 infected mosquitoes 35 were found with filarial infections between January and June but no factor was found to account for this. *T. H. Davey*

DA COSTA, O. R. Contribuição ao conhecimento da filariose na Amazônia. [**Contribution to the Information on Filariasis in Amazonia**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1956, Dec., v. 8, No. 2, 329–422, 17 figs. & 1 graph. [129 refs.]

This is a long thesis presented in connexion with the Chair of Parasitology of the Faculty of Medicine and Surgery, Pará, Brazil. The first chapter is historical, the second is a résumé of the morphology and biology of *Wuchereria bancrofti* and *Mansonella ozzardi*. The third relates to pathogeny and symptomatology, the fourth to laboratory diagnosis, the fifth to epidemiology and the sixth to treatment and prophylaxis.

The original work reported relates to the examination of blood of 6,555 persons in 26 localities. The blood was collected between 19.00 and 21.00 hours by finger puncture; thick drops were stained with Giemsa stain, and if embryos were seen haematoxylin was used to demonstrate morphology. In one place a special search was made for *M. ozzardi*, and day blood was collected in amounts of 20 cmm. for examination. Of the 6,555 persons 1·1% showed microfilariae—0·9% *W. bancrofti* and 0·2% *M. ozzardi*.

There was a sharp geographical division in that no autochthonous case of *W. bancrofti* infection was found in the State of Pará. These findings are discussed at length.

The thesis includes a valuable list of references. *Charles Wilcocks*

GOLVAN, Y. J. Les principales techniques de coloration des microfilaires sanguicoles. [**Technical Essentials in the Staining of Blood Microfilariae**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 143–57, 1 fig. [11 refs.]

Having outlined the criteria of differential diagnosis of the microfilariae found in blood, with illustrations of the principal species occurring in human blood, the author proceeds to discuss and describe methods of staining them. These he classifies into 4 groups: (1) vital staining, (2) post-vital staining, (3) staining of films which have been fixed before they were completely dried, (4) staining of dried films or drops.

The various techniques investigated are described in detail with their advantages and disadvantages. A useful table is provided which outlines the staining effects of 5 different stains on the principal structures in the microfilarial body: neutral red, azure II eosin, glychaemalum, methyl

green pyronin, Giemsa. Of these, Giemsa's stain is said to be the easiest and gives the most constantly good results.

[This paper should be read in the original by those interested. The various techniques described cannot be easily abstracted in detail.]

J. J. C. Buckley

Golvan, Y. J. & Larivière, M. Aspects des microfilaires de *Wuchereria bancrofti* dans les étalements de culots de centrifugation urinaires. [**Appearance of the Microfilariae of *Wuchereria bancrofti* in Centrifuged Urinary Deposits**] *Ann. Parasit. Humaine et Comparée.* 1957, Apr.–June, v. 32, No. 3, 286–9, 6 figs.

The authors' summary in French is freely translated as follows:—

In the urinary deposit of a chyluria patient (Senegalese) infected with *W. bancrofti*, microfilariae were found which did not exhibit the broad regular curves which characterize them in thick blood smears. On the contrary, their attitude was "stiff", with numerous secondary curves, and they could easily be mistaken for microfilariae of *L. loa*. But in the other morphological characters (size and body nuclei, size of excretory and anal pores, and "inner body") they were clearly the microfilariae of *W. bancrofti*.

We repeat that although the attitude and retraction pattern of microfilariae which occur in the blood are excellent diagnostic features, they are only of use in thick drops of blood. They lose all their value in thin blood films used in haematological techniques and when the microfilariae are in a liquid other than blood serum. *J. J. C. Buckley*

Edeson, J. F. B. & Wharton, R. H. **The Transmission of *Wuchereria malayi* from Man to the Domestic Cat.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, July, v. 51, No. 4, 366–70.

This preliminary paper describes a most interesting and important series of experiments which are summarized by the authors as follows:

"(1) The successful transmission of *Wuchereria malayi* from man to the domestic cat by direct inoculation of infective larvae is described.

"(2) The pre-patent periods in the five cats infected were 80, 81, 81, 82 and 96 days.

"(3) The microfilariae were apparently indistinguishable from those of the human donors, and they developed normally in the vector mosquitoes.

"(4) Adult worms corresponding to the description of *W. malayi* were recovered from two of the cats.

"(5) The possible implications are discussed."

The inoculation of cats with infective larvae, dissected from experimentally infected *Mansonia uniformis* 10–12 days after these had fed on

a human carrier of *W. malayi*, was carried out by subcutaneous inoculation from a syringe. This inoculation technique, which is described in detail, was devised especially to ensure the optimum transmission of larvae from the syringe to the cats.

Elaborate precautions were taken to ensure that the cats were kept free from exposure to non-experimental infection with filariae before, during and after the experimental exposure. Control cats did not become infected. 2 of the cats which were experimentally infected were kept under observation from 12 and 20 weeks respectively after the first appearance of microfilariae in their blood, and during these periods microfilariae were always present and there was no falling off in their numbers.

The success of these experiments makes possible the study of the development of the parasite in the definitive host and also the study of the chemotherapy of filariasis, especially the action of the piperazine drugs on the adult parasites. The authors point out the considerable epidemiological problems raised by the transmission of human filariasis to cats.

[See also this *Bulletin*, 1956, v. 53, 1156.] *J. J. C. Buckley*

Schofield, F. D. **The Complement-Fixation Reaction in Loiasis and *Acanthocheilonema perstans* Infections.** *J. Trop. Med. & Hyg.* 1957, July, v. 60, No. 7, 170–72.

The author studied the case histories of 127 untreated patients with loiasis in relation to the results of complement-fixation (CFT) tests with *Dirofilaria immitis* antigen, carried out and interpreted in the manner described by Ridley [this *Bulletin*, 1956, v. 53, 1464]. The patients had been seen at the Hospital for Tropical Diseases, London, between 1952 and 1957, and all had come from Nigeria, the Cameroons or the Belgian Congo where loiasis is endemic. The patients were in 2 categories: (1) those in whom microfilariae or adult worms had been found, (2) those diagnosed clinically on the basis of absolutely characteristic histories, especially the presence of typical Calabar swellings. The interval between the first appearance of symptoms and the date on which blood was taken for the CFT was noted, and the length of each patient's stay in Africa. Note was also made of those in whom other filarial worms were found or in whom they were suspected on clinical grounds. The patients were placed in 4 groups according to the length of history of their symptoms, namely less than 1 year, 1 to 3 years, 3 to 7 years and more than 7 years.

The results are shown in tables and analysed statistically. From this study, it emerges that there was a relationship between the incidence of negative CFT tests and the length of the histories. Those with very short and very long histories gave a high proportion of negative CFT tests. Those with histories of 1 to 3 years all gave positive reactions. The

differences were significant and were not due to other coexistent filarial infections. Negative CFT results were much commoner in "proven" than in "clinical" cases and this is linked with the finding that the proportion of "proven" cases rose with the length of time symptoms had been present.

The differences found are taken to reflect changes in host-parasite relationship, connected either with the duration of the infection or with the chance of re-infection.

53 patients from the same areas and having *Dipetalonema perstans* infection were also studied. Only 8 gave positive CFT results. It is suggested that these may well have been due to the undetected presence of another filarial species. *H. J. O'D. Burke-Gaffney*

Biguet, J., Deblock, S., Ledoux, G. & Capron, A. Le parasitisme intestinal en milieu psychiatrique dans la région du Nord de la France. I.—L'oxyurose chez un millier d'aliénés adultes. Influence exclusive des facteurs éthologiques sur la fréquence et le degré de l'infestation aux divers âges de la vie. [**Intestinal Parasitism in a Psychiatric Environment in the Region of the North of France. 1. Enterobiasis in a Thousand Adult Mental Patients. Exclusive Influence of Ethological Factors on the Frequency and Degree of Infection at Various Ages of Life**] *Bull. Soc. Path. Exot.* 1957. May–June, v. 50, No. 3, 411–17.

In a psychiatric establishment at Armentières the authors examined 1,003 adult males aged 18 to 79 years by the Graham adhesive tape method, only one examination of each patient being possible, so that the incidence recorded is possibly about 20% below the actual incidence in the group examined. All but 14 of the patients lived in houses on a farm in the hospital precincts, some being confined to these houses, others being allowed out to work. A table gives the results according to the houses occupied, the number of beds and the mental states of the patients. Another expresses the results in relation to the patients' ages. This table shows that there was no relation between the patients' ages and the frequency and intensity (as judged by the numbers of eggs on the tapes) of the infections.

Of the 1,003 patients examined 535 (53·34%) were shown to be infected, and the authors compare their results with those obtained by earlier authors whom they quote. They discuss the factors governing the infections and conclude that, contrary to their earlier hypothesis [Coutelen *et al.*, this *Bulletin*, 1957, v. 54, 330], adult patients have no immunity, not even a partial one, that the infections resembled those found in groups of heavily infected children and that their spread, at all ages, depended solely on such factors as overpopulation of the houses,

confinement of patients to them and absence of hygiene among patients of this kind. *G. Lapage*

Doby, J. M., Bonvarlet, J. & Doby-Dubois, M. L'oxyurose infantile chez les populations de la région de Yaoundé (Cameroun). Résultats de 3,000 examens par la technique de Graham. [**Infantile Enterobiasis in Populations of the Region of Yaoundé (Cameroons). Results of 3,000 Examinations by the Graham Technique**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 433–46, 2 figs. [11 refs.]

The authors describe the climate of the Yaoundé region, the races living there and their religions and modes of life. A map of the area is given.

Of the 3,000 children examined, 1,500 were Africans aged 15 days to 3 years; 1,186 were African schoolchildren aged 3 to 15 years; and 314 were European children aged 3 to 13 years. Only one examination per child could be made at various times of the day and the authors therefore believe that their results (given in 5 tables) are below the actual degrees of infection. They estimate the actual infection rates at 90% of the white children aged 3 to 13 years and 40 to 45% of the African children aged up to 16 years. In all the localities the incidence among children not of school age was about 15 to 20%, the higher incidence among schoolchildren being perhaps due to their association together. The highest incidence was found at a school at Oveng, attended by more than 1,000 children. Children at Oveng aged 2 to 2½ years, who went with older children to school, showed an incidence of 45%, while the incidence among children of the same age who did not do this was only 25%.

The high incidence among the white children is echoed in earlier papers by other authors quoted [this *Bulletin*, 1947, v. 44, 215] and it is possible that race alone is a factor influencing the incidence. Among the Africans the Mohammedan Hausa children were the most heavily infected, but this could not be explained by their association together at school, because these children went to many small schools with about a dozen pupils each. Perhaps their high infection was explained by their intimate life in their closed, ill-ventilated homes and by their long robes and pantaloons closed at the ankles, which contrasted with the scantier or even non-existent clothing of the other African children.

Sex had little relation to the frequency of the infection, although, among the white children, 73·14% of males and 64% of females were infected. Among the African children none were infected before the age of 1 month, but at this age infection appeared suddenly and was maintained up to the age of 1 year in about 15% of the children. A second increase then occurred which reached about 45% at 3 years and remained

constant throughout school life. No European children younger than 3 years could be examined, but during school life the incidence among them was constant at about 70%. *G. Lapage*

Berni, A. & Massi, O. Un episodio di trichinosi: considerazioni cliniche, epidemiologiche e profilattiche. [**Observations on an Outbreak of Trichinosis in Rome**] *Nuovi Ann. d'Igiene e Microbiol.* 1957, Sept.–Oct., v. 8, No. 5, 471–80. [16 refs.]

The English summary appended to the paper is as follows:—

"After having recalled the outbreaks of Trichinosis which occurred in Italy since 1865, the authors report a localized epidemic observed in Rome in 1953. Seven persons belonging to two related families became contaminated by eating sausages from a swine that had privately been slaughtered in Valle Nera (Perugia).

"The symptoms were clearly evidenced in 6 out of the seven cases, while in the seventh they were very moderate. The course of the disease was a benign one by all patients.

"The recognition of the infection performed on the residues of the sausages by testing with the artificial digestion method gave a finding of *Trichinella spiralis*. The authors emphasize the importance of the inspection and control not only of the slaughter houses, but also of the private slaughterers."

Suessenguth, H., Bauer, A. H. & Greenlee, A. M. **Evaluation of the Suessenguth-Kline Test for Trichinosis.** *Pub. Health Rep.* Wash. 1957, Oct., v. 72, No. 10, 939–42.

In previous papers [this *Bulletin*, 1946, v. 43, 360; and *Amer. J. Med. Technol.*, 1947, v. 13, 213] Suessenguth and Kline described a simple and rapid flocculation slide test for the laboratory diagnosis of trichinosis. When using this test "An antigen emulsion made of cholesterol crystals coated with an alkaline extract of lyophilized trichinae larvae is mixed on a slide with the serum to be tested and rotated for 4 minutes. The result is read microscopically by the degree of flocculation of the coated crystals". In order to test whether the technique would give similar results when employed by different workers, duplicate portions of serum specimens from suspected trichinosis cases and from random samples of blood submitted for routine tests of syphilis, were examined in two different laboratories. "The reproducibility of the flocculation slide test was shown by the 97·1 percent complete agreement and 1·1 percent partial agreement of the results obtained in two laboratories where duplicate tests were performed on 1,216 serum specimens.

"An analysis of 62 cases showed the test to have a high degree of sensitivity and specificity. Of 27 positive test results, 25 were for cases

diagnosed as trichinosis; for 1 of the other 2 cases, the diagnosis can be regarded as inconclusive. Of 35 negative test results, none were for cases diagnosed as trichinosis; although there had been definite exposure to trichinous meat in 2 cases, no clinical symptoms of the disease were evident.

"In a comparison of the S-K flocculation slide test with the complement fixation test, the flocculation slide test showed greater sensitivity. It gave positive results for 11 diagnosed cases of trichinosis for which the complement fixation method gave negative results." *R. M. Gordon*

HILL, C. H. **Distribution of Larvae of *Trichinella spiralis* in the Organs of Experimentally Infected Swine.** *J. Parasitology.* 1957, Oct., v. 43, No. 5, 574–7.

"Fifty-five pigs from 61 days to 8 years of age were experimentally infected, at the rate of 400 to 600 larvae per pound of body weight, with trichinae contained in ground pork.

"These pigs were sacrificed 21 to 162 days after infection, and the various organs and tissues were ground in a meat chopper and artificially digested to recover the parasites.

"In those instances in which the same organ was examined in more than 1 pig, trichinae were recovered from the following locations, with percentage frequencies given in parentheses: Diaphragm (100), stomach wall (18), testes (15), liver (11), brain, lung, and wall of the small intestine (9 each), pancreas and aorta (8 each), urinary bladder contents (7), urinary bladder wall (5), and heart (2). Trichinae were recovered from the one spinal cord examined, but were not recovered from the kidneys, gall bladder contents, spleen, ovaries, wall of the large intestine, uterus, or Fallopian tubes. Larvae recovered from the stomach wall, liver, brain, lungs, pancreas, and spinal cord were infective to rats. These findings emphasize the importance of cooking or otherwise processing all edible portions of the hog carcass whether or not they contain striated muscle tissue, in order to destroy trichinae."

RITTERSON, A. L. **The Chinese Hamster (*Cricetulus griseus*) as an Experimental Host for *Trichinella spiralis*.** *J. Parasitology.* 1957, Oct., v. 43, No. 5, 542–7, 3 figs. [11 refs.]

"Each of 21 Chinese hamsters was infected with approximately 100 larvae of *T. spiralis* from a Golden hamster. Adult worms were recovered from the small intestine through the 26th day of infection. Small numbers of viable larvae were recovered from carcasses of hamsters infected for 26 days or more.

"Adrenal weight-body weight ratios were highly variable and had no

clear relation to the experimental infection. Spleen-body weight ratios averaged higher during the migratory phase of the infection.

"Histological examination of the adrenal exhibited no pathological changes. Myositis was evident at 14 days of infection. At 26 and 40 days, the inflammatory reaction was moderate to severe in all animals. Cysts were observed in sections, but none showed normal larvae. Diaphragm press and/or pepsin digests confirmed infection in all animals with infections of 26 or more days' duration. Minimal muscle reaction was observed at 112 days.

"*In vivo* observations on cheek pouches at 112 days revealed no parasites. Stained whole mounts of retractor muscle disclosed an inflammatory response which appeared not to be related to the experimental infection."

DEFICIENCY DISEASES

BANERJEE, B. **Nutritional Levels and their Seasonal Variations in Residents of Assam of Different Categories.** *J. Indian Med. Ass.* 1957, Oct. 1, v. 29, No. 7, 280–84, 2 figs.

This paper records the diets consumed during one week by young persons of each sex living in hostels, by middle-class men, by skilled labourers and by army personnel. The dietary intake of nutrients for all the categories fell below American and British standards of requirements. Yet none of the groups showed any evidence of deficiency diseases. The possibility of producing dietary standards for India, which would be at a lower level than the recommended British and American standards, is discussed.

In the hostel, calorie intake, both for men and women, was slightly lower in the summer than in the winter. [Unfortunately no climatic data are given and it is not possible to assess the significance of these findings.] *R. Passmore*

CHIN, I. *et al.* **Survey on Nutritional Status of School Children after the Flood in Central Kyushu, May 26, 1953.** *Kurume Med. J.* 1957, v. 4, No. 1, 27–34.

In 1953 the River Chikugo in Kyushu, Japan, flooded and caused great destruction and 150 deaths. Much of the rice harvest was destroyed and the people were "obliged to live their hard days in their damaged home". For 50 days UNICEF supplied 22 gm. of dried skimmed milk to each of the schoolchildren. This was associated with

an improvement in health as judged by clinical examination. The percentage of schoolchildren graded as undernourished dropped from 10 to 4.

R. Passmore

MacDougall, Lorna G. **The Effect of Aureomycin on Undernourished African Children.** *J. Trop. Pediatrics.* London. 1957, Sept., v. 3, No. 2, 74–81. [25 refs.]

"A brief introduction concerning the growth-promoting and other effects of minimal daily dosage of aureomycin in animals and human beings is given, and the reasons for undertaking the present clinical trial outlined.

"Seventy-two severely undernourished African children of average age 2 years were observed over a period of 2–7 weeks in order to assess the effect of small daily doses of aureomycin on growth, appetite, serum proteins, haemoglobin, red blood cell count and the control of intercurrent infections. 38 of the children received 50 mg. of aureomycin daily, and a control group of 34 children received placebos. The dietary and nursing regimes were the same in both groups.

"The weight increases in the two groups showed a highly significant difference, those children on aureomycin having an average daily weight gain of 45·3 gm. as compared with 14·1 gm. in the controls. It was also found that aureomycin had the effect of improving general nutritional status, appetite and mental well-being as assessed by clinical observation.

"A significant increase in the total serum protein, serum albumin and haemoglobin levels was observed in the aureomycin group, but no significant change in the red blood cell count in either group. The significant rise in serum globulin which occurred in the control group was not noted in the aureomycin-treated group.

"Ward cross infections were by no means eliminated, but there was a lower incidence among those receiving aureomycin, and fewer cases showed a period of static weight or weight loss during such infections. Aureomycin also appeared to cut short the duration of non-specific diarrhoea. No drug reactions, allergies or other untoward side effects were noted as the result of aureomycin administration."

[The author states that the general clinical picture of the malnourished children admitted to the King George VI Hospital, Nairobi, differs from the "typical" kwashiorkor cases seen in Kenya in that many cases show a picture of severe emaciation and in the majority there is a preceding history of acute infection. Diarrhoea is frequent and often delays recovery, oedema is rare and protein levels are often within normal limits. The trial of aureomycin (chlortetracycline) is well devised and the observations give a clear result. It is probable that a great deal of the malnutrition is not a primary protein deficiency but is secondary to infections—enteric, respiratory, measles and whooping cough, but mainly enteric.]

Cicely D. Williams

Ground, K. E. U. **The Dermatosis associated with Kwashiorkor in Basutoland.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, Sept., v. 51, No. 5, 433–8. [13 refs.]

11 patients, aged 11 to 42 months, suffering from kwashiorkor with dermatosis were treated with nicotinic acid, but remained on a diet of mealie-meal. In 8 the dermatosis cleared, but in 3 there was no response. It is concluded that niacin deficiency may be an important cause of the dermatosis in kwashiorkor, but other factors may also be responsible.

R. Passmore

Smit, Z. M. & Pretorius, P. J., with the technical assistance of H. S. Meij, E. E. Venter & J. E. Hagmann. **Some Biochemical Changes in Kwashiorkor.** *South African J. Lab. & Clin. Med.* 1957, June, v. 3, No. 2, 142–8, 3 figs. [36 refs.]

Changes in the level of various substances in the serum of patients with kwashiorkor, treated with skimmed milk formulae but with no added vitamin, were measured. After 4 weeks the mean value for the following levels rose: albumin (from 1·70 to 3·46 gm./100 ml.), globulin (from 2·29 to 3·40 gm./100 ml.), amylase (from 50 to 130 Somogyi units) and cholesterol (from 130 to 197 mgm./100 ml.). Vitamin C and carotene levels remained low and unchanged. *R. Passmore*

Béhar, M., Viteri, F. & Scrimshaw, N. S. **Treatment of Severe Protein Deficiency in Children (Kwashiorkor).** *Amer. J. Clin. Nutrition.* 1957, Sept.–Oct., v. 5, No. 5, 506–15, 1 fig. [33 refs.]

This paper gives with a wealth of detail the treatment of kwashiorkor based on the use of fluids and electrolytes, antibiotics, proteins, iron and a gradual return to a balanced diet; this practical account of what is now orthodox medicine can be strongly recommended to physicians.

R. Passmore

Kahn, E. **A Neuropathy in Children recovering from Malnutrition (Kwashiorkor).** *Central African J. of Med.* 1957, Oct., v. 3, No. 10, 398–400, 2 figs.

"Three cases are reported of a neurological syndrome related to the recovery phase of infantile malnutrition. The syndrome consists mainly of extra-pyramidal components, viz., tremors and postural abnormalities. Involvement of the pyramidal tract is slight and less constant. Complete recovery from the syndrome is the rule. A summary is given of the investigations undertaken to elucidate the cause of the syndrome."

[See this *Bulletin*, 1956, v. 53, 1264; 1957, v. 54, 78.]

Stuart, K. L. & Bras, G. **Veno-Occlusive Disease of the Liver.** *Quart. J. Med.* (n.s.) 1957, July, v. 26, No. 103, 291–315, 15 figs. (11 on 5 pls.) [Numerous refs.]

This is a useful account of 84 patients with veno-occlusive disease of the liver in Jamaica with much clinical and pathological detail. There is, however, little that is new and which has not been covered in abstracts of previous papers by these authors [this *Bulletin*, 1954, v. 51, 972, 973; 1955, v. 52, 394, 568; 1957, v. 54, 77]. *R. Passmore*

Jelliffe, D. B., Bras, G. & Mukherjee, K. L. **Veno-Occlusive Disease of the Liver and Indian Childhood Cirrhosis.** *Arch. Dis. in Childhood.* 1957, Oct., v. 32, No. 165, 369–85, 14 figs. [Numerous refs.]

This paper describes 15 patients with Indian childhood cirrhosis [the new name for infantile biliary cirrhosis], whom the authors saw in Calcutta. The condition is contrasted with veno-occlusive disease of the liver, as it presents in Jamaica. In general the similarities are marked. The Indian disease, however, appears to be always insidious in onset, whereas the Jamaican may follow upon an acute attack of liver failure. Beautiful photomicrographs show histological pictures which in general resemble the Jamaican findings with occlusion of central hepatic veins prominent. It would appear probable that the cirrhosis arises secondarily to this occlusion. The possibility that plant toxins may be responsible for the disease in India is discussed, but left unresolved.

R. Passmore

SPRUE

Glass, G. B. J. & Boyd, L. J. **Differentiation of Macrocytic Anemias and Diagnosis of Pernicious Anemia and Sprue in Remission by Accelerated Measurement of Hepatic Uptake of Radioactive $Co^{60}B_{12}$.** *Ann. Intern. Med.* 1957, Aug., v. 47, No. 2, 274–92, 3 figs. [42 refs.]

Many cases of dietary folic acid or vitamin B12 deficiency and sprue cannot, it is stated, be distinguished from pernicious anaemia by any available criterion. [This premise is open to the criticism that if bowel function and fat absorption are fully investigated a differentiation is usually possible.] Demonstration, however, of the absence of Castle's intrinsic factor from the gastric juice enables a diagnosis of pernicious anaemia to be made with certainty. Until recently, proof of the presence of intrinsic factor in a sample of gastric juice necessitated tedious repetition of reticulocyte counts after the administration of the juice to be

tested together with a source of vitamin B12 to a patient with pernicious anaemia in relapse. With the introduction of vitamin B12 labelled with radio-active cobalt, however, it has become possible to assess the amount of the vitamin absorbed by a patient and thus indirectly to demonstrate the presence or absence of the intrinsic factor. Estimation of the labelled vitamin B12 may be carried out in the faeces, urine, serum or liver. In the liver it is detected by a scintillation counter by scanning over the liver area. After the administration of a test dose of the labelled vitamin to normal persons radio-activity of the liver usually reaches a peak after one week, but when a similar dose is given to patients with pernicious anaemia either in relapse or remission, none or only traces of radio-activity can be detected. If, however, the same dose is administered together with normal gastric juice or a potent concentrate of intrinsic factor to a patient with pernicious anaemia, a large part of the dose can be demonstrated to be absorbed and to be transmitted to the liver.

When the same test was applied to patients with sprue it was found that most of them could not absorb vitamin B12 from the intestine, and in contrast to the patients with pernicious anaemia this defective absorption could not be corrected by the addition of intrinsic factor. Details of the technique used are given in full, as are the results of tests in patients with pernicious anaemia in relapse (10 patients), sprue (5 patients), nutritional macrocytic anaemia (7 patients), pernicious anaemia in remission (10 patients) and achlorhydria refractory to histamine, without anaemia (12 patients). It is stated that of the 7 patients with nutritional macrocytic anaemia 5 were caused by nutritional vitamin B12 or folic acid deficiency and 2 were of macrocytic non-pernicious anaemia of unknown origin. Their absorption of labelled vitamin B12 was normal and so also was that of 9 of the 12 patients with achlorhydria of the gastric juice. The remaining 3 patients belonged to an older [unspecified] age-group. To one of them the addition of intrinsic factor brought about a markedly increased uptake of labelled vitamin B12; the improvement of the 2 other patients was less marked and the pattern more nearly resembled that of sprue.

[This is a valuable paper drawing attention to a new investigational technique. The failure of patients with sprue to absorb vitamin B12 is also of great pathological interest. The question remains, however, whether those with sprue here being investigated were similar to those encountered in India and the Far East, for here—as in most other American work on the subject—no reference is made to the presence or absence of steatorrhoea, no fat absorption studies appear to have been carried out and the diagnosis has, it seems, largely been made on haematological grounds and because vitamin B12 was not absorbed from the intestine even when administered together with intrinsic factor. Clearly, however, no logical defence can be made of a situation in which the aim is to determine the as yet unknown absorption pattern in a

disease and the disease is then defined as one in which—along with other criteria—a specific type of absorption pattern occurs.]

A. W. Woodruff

HAEMATOLOGY

Payet, M., Linhard, J., Pene, P. & Armengaud, M. Considérations étiologiques et hématologiques à propos de 152 cas d'anémies en milieu africain à Dakar. [**Cause and Type of 152 Anaemias in Africans in Dakar**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 486–96.

From January 1955 to August 1956 the authors have seen in Dakar 152 adult or adolescent Africans in whom the main cause of morbidity was anaemia. They were 75 men and 75 women and were among 1,838 men and 1,153 women admitted to hospital during that period (4% of the men and 6·6% of the women). Tropical infections contributed the major part—58 patients (40 ankylostomiasis, 12 malaria, 6 schistosomiasis). The hepato-splenic syndrome was the second most important cause leading to the admission of 33 patients. There were 18 women with post-partum malnutrition. Of the remainder 14 had melaena, non-parasitic haematuria, epistaxis, etc., in 9, sickle-cells were found although a precise diagnosis of the disorder, whether homozygous or heterozygous (haemoglobin-C–sickle-cell disease) could not be made, 7 had nephritis, 5 systematic blood diseases such as leukaemia, and in 35 no definite cause could be established. It will be noted that the total number of diagnoses exceeds the figure of 152. This is due to the need for making more than one diagnosis per patient. In 94 patients a detailed haematological study was made and it may be worth extracting in table form part of the diagnostic data.

Cause	*Total*	*Single Cause*	*In Association*
Ankylostomiasis	26	18	8
Post partum malnutrition ...	6	4	2
Malaria	8	6	2
Sickle Cells	6	5	1
Schistosomiasis	2	1	1
Hepatosplenic syndrome ...	18	10	8
Nephritis	5	4	1
Leukaemia, etc.	4	3	1
Epistaxis, etc.	9	7	2
Non-diagnosed	12	–	–

The treatment followed the accepted lines and of the 152 patients only 5 died in hospital.

H. Lehmann

Laing, S. R. S. **Refractory Anaemia, a Problem in Diagnosis and Epidemiology in a Tea Garden in Assam.** *J. Trop. Med. & Hyg.* 1957, June, v. 60, No. 6, 131–6.

This is an account of 76 cases of refractory anaemia, 11 of them fatal, occurring in a tea garden in Assam. In 46 the onset was abrupt, prostration extreme, and there was fever, a purpuric rash, soreness of the mouth and throat and pain on swallowing.

Treatment included administration of vitamins C and K, calcium gluconate, various antibiotics and sulphonamides, oral and intravenous iron, liver extract, vitamin B12 or folic acid or both. The impression was gained that the patients responded best to a combination of folic acid and iron with, if the temperature was raised, the addition of streptomycin.

Unfortunately, no marrow investigations were carried out and post mortem examinations were refused on those patients who died.

The cause of the outbreak remains unknown, but on grounds which will not bear critical examination the author suspected the use of Daraprim [pyrimethamine] as an antimalarial among the tea garden workers. The peak of the outbreak occurred 6 weeks after Daraprim had first been taken among the tea garden workers but some cases occurred in May in the same month in which the administration of Daraprim was begun. [It is not stated whether any cases were encountered before the introduction of Daraprim. Although the enthusiasm which has led to this investigation is to be commended, the drawing of any conclusion from the incomplete data obtained must be deplored.]

A. W. Woodruff

See also p. 205, Glass & Boyd. **Differentiation of Macrocytic Anemias and Diagnosis of Pernicious Anemia and Sprue in Remission by Accelerated Measurement of Hepatic Uptake of Radioactive $Co^{60}B_{12}$.**

Saugrain, J. Nouvelles recherches sur la drépanocytose à Madagascar. [**New Investigations on Sicklaemia in Madagascar**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 480–86. [10 refs.]

In a former investigation (*Bull. Soc. Path. Exot.*, 1954, v. 47, 844) the author examined for sickling the Merinas, a predominantly Indonesian population in the north of Madagascar. He had then found the incidence of sickling to be 27 in 775 examined (3·5%). This was considered to support the view that the African admixture was slight among these people. In the present study people from the east, west and south coast were also examined. Among the predominantly African inhabitants of the west coast 11·5% with sicklaemia were found in 665 Sakalavas, but, surprisingly, only 6% in 322 Makoas. In the east and the south the racial mixture is mostly African-Arab-Indian. Here in the Antaimoros

(485), Antaisakas (555), and the Baras (292) sicklaemia was 21, 22 and 17%, respectively.

[The article contains an interesting discussion of the anthropological aspects of this finding, but its value would be greatly enhanced if the sickling incidence was related not only to the racial composition of these populations but also to the severity of malarial infection in the areas where they live.] *H. Lehmann*

de Torregrosa, Mercedes V. V., Rivera-Trujillo, A., Ortiz, A. & Ruiz Soler, O. **Abnormal Hemoglobins among Puerto Ricans.** *Bol. Asoc. Med. de Puerto Rico.* 1957, Apr., v. 49, No. 4, 145–54, 3 figs. [26 refs.]

This work was undertaken to determine the incidence of abnormal haemoglobins in Puerto Rico. In addition patients who had been diagnosed clinically as having "sickle-cell anaemia" were investigated to find out whether the sickling disease was due to sickle-cell haemoglobin alone, or whether there was an association of this haemoglobin with other abnormal haemoglobins. The authors examined in the first place 618 Puerto Ricans who were donors at a blood bank or patients at the San Juan City Hospital and were not suffering from a blood disorder. 263 were apparently white and of them 2 showed the sickle-cell trait. The rest, 355, were either mulattoes or Negroes and of them 24 showed sickling (6·8%). The percentage of haemoglobin S in the trait carriers varied from 25 to 46.

3 patients who had been thought to suffer from sickle-cell anaemia were found to be in fact sickle-cell trait carriers suffering from rheumatic fever and massive ascariasis, rheumatic heart disease and infective hepatitis respectively. A fourth patient showed the unusual combination of sickle-cell trait and spherocytic jaundice, and a fifth had sickle-cell–haemoglobin-C disease. A sixth was in fact suffering from thalassaemia of moderate severity and had no sickle-cell haemoglobin at all.

The diagnosis of homozygous sickle-cell anaemia confirmed by laboratory and family studies was made in 6 instances. *H. Lehmann*

Fowler, N. O., Smith, O. & Greenfield, J. C. **Arterial Blood Oxygenation in Sickle Cell Anemia.** *Amer. J. Med. Sci.* 1957, Oct., v. 234, No. 4, 449–58. [18 refs.]

Little attention has been paid by workers interested in sickle-cell anaemia to work by Becklake *et al.* [this *Bulletin*, 1955, v. 52, 927], who found that the oxygen dissociation curve of blood from 4 patients with sickle-cell anaemia was significantly displaced to the right, *i.e.*, showed less affinity to oxygen than normal blood. 6 of 7 bloods from sickle-cell trait carriers did not show such change. These observations, together with those by Wyman *et al.* (*J. Polymer. Sci.*, 1951, v. 7, 499; *J. Biol.*

Chem., 1953, v. 203, 81) on the oxygen affinity of dialysed solutions of normal adult and sickle-cell haemoglobins, were taken to show that the difference in oxygen affinity was due to some non-haemoglobin dialysable factors. The present authors have re-examined the phenomenon of the low oxygen affinity of blood in sickle-cell anaemia, and in particular have compared sickle-cell anaemia patients with normal people and patients with other types of anaemia. They found that 10 sickle-cell anaemia patients showed not only a lower oxygen affinity, *i.e.*, a reduction in arterial oxygen saturation, but also an increased gradient in the oxygen tension from alveolar air to arterial blood. This gradient could be reduced towards normal by letting the patients breathe 15·6% oxygen. Neither of the abnormalities was seen in 11 normal subjects or in 8 patients with other anaemias.

There seem to exist, therefore, two difficulties of oxygenation in sickle-cell anaemia, one is the lower *in vivo* affinity of the haemoglobin towards oxygen, and the other is a pulmonary defect which causes a failure in the maintenance of the normal alveolar-arterial oxygen tension gradient.

H. Lehmann

Ager, J. A. M. & Lehmann, H. **Intra-Erythrocytic Haemoglobin Crystals.** *J. Clin. Path.* 1957, Nov., v. 10, No. 4, 336–8, 2 figs. [10 refs.]

"When a prolonged sickle cell test was performed on red cells containing not sickle cell haemoglobin but a wide variety of other haemoglobins, intra-erythrocytic crystals were noted. There did not seem to be a difference between cells containing haemoglobin C and others. Crystals were also obtained when the suspending solution consisted instead of reducing agents of sodium or potassium citrate or chloride solutions. No crystals were obtained when partial drying was completely prevented."

[See this *Bulletin*, 1956, v. 53, 924; *J. Lab. & Clin. Med.*, 1956, v. 47, 700.]

Chatterjea, J. B., Saha, A. K., Ray, R. N. & Ghosh, S. K. **Haemoglobin E-Thalassemia Disease.** *Indian J. Med. Sci.* 1957, Aug., v. 11, No. 8, 553–64, 1 chart & 4 figs. (3 on pl.) [42 refs.]

In Bengal so far 190 families have been seen who had one or more members with thalassaemia. But whereas thalassaemia major is usually a severe disorder and occurs in children of whom both parents show evidence of thalassaemia minor, a number of the patients were only mildly affected and there was evidence of thalassaemia in only one of the parents. 35 of such patients were studied in detail and in 20 it was found that they were in fact doubly heterozygous for the genes responsible for haemoglobin E and thalassaemia and the true diagnosis was haemoglobin-E-thalassaemia. All of them were from Bengal, 3 Muslims

and 17 Hindus. 6 of these were severely anaemic (haemoglobin varying from 2·9 to 5·2 gm.%) and the other 14 showed moderate anaemia (5·5–9·6 gm.%).

The spleen was enlarged in all 20 patients and the liver in all but 1. Splenectomy was done in 7 patients and produced partial clinical and haematological improvement, similar to that seen in homozygous thalassaemia. Clinically haemoglobin-E-thalassaemia was not distinguishable from the milder forms of thalassaemia major. Some of the patients enjoyed fairly good health and pursued a normal life, with only slight interference by chronic fatigue and weakness.

Haemoglobin E seems about as frequent in Bengalis as thalassaemia. In 700 unrelated persons selected at random 25 were found to be haemoglobin E heterozygotes, 2 were haemoglobin E homozygotes, and 26 were heterozygous for the thalassaemia gene. *H. Lehmann*

VENOMS AND ANTIVENENES

DE VRIES, A. & GITTER, S. **The Action of *Vipera xanthina palestinae* Venom on Blood Coagulation *in vitro*.** *Brit. J. Haematol.* Oxford. 1957, Oct., v. 3, No. 4, 379–86, 1 fig. [22 refs.]

"*Vipera xanthina palestinae* venom retards clotting of human blood *in vitro* by interference with the formation of thromboplastin and of thrombin from prothrombin by the action of thromboplastin.

"The anticoagulant activity of the venom is located in electrophoretic fractions which are neurotoxic; they do not produce haemorrhage in mice and having no protease or phosphatidase activity.

"The anticoagulant effect of the venom is not due to destruction of a clotting factor, but to a coagulation-inhibitory action which is reversible by specific antiserum."

[See this *Bulletin*, 1954, v. 51, 724.]

LIN, Yu-Chan, SU, Tian-Chuan & LING, Kuo-Huang. **Further Study on the Mechanism of the Inhibition of Succinic Acid-Cytochrome c Reductase by Cobra Venom.** *J. Formosan Med. Ass.* 1957, May, v. 56, No. 5, 176–81, 6 figs. [17 refs.]

MOHAMMED, A. H. & ZAKI, O. **The Walterinnesia Toxin as a Liberator of Histamine from Tissues.** *J. Trop. Med. & Hyg.* 1957, Nov., v. 60, No. 11, 275–80, 9 figs. [11 refs.]

"(i) When the isolated diaphragm of a rat is placed in Tyrode solution containing different concentrations of *Walterinnesia* venom, histamine contained in the muscle diffuses rapidly into the surrounding fluid.

"(ii) There is a direct relationship between the concentration of the venom and the rate and amount of histamine released.

"(iii) The effect of temperature on the rate of release has been determined.

"(iv) The effect of oxygen lack shows that the release is probably a vital process.

"(v) Possible mechanisms by which the venom may cause a release of histamine are discussed."

[See this *Bulletin*, 1952, v. 49, (902).]

Schenone, H., Rosales, S. & Garcia, E. M. Caso de loxoscelismo cutaneo visceral en Mendoza. [**A Fatal Case of Cutaneous-Visceral Loxoscelism in Mendoza (Argentina)**] *Bol. Chileno de Parasit.* 1957, July–Sept., v. 12, No. 3, 56–9. [14 refs.]

The English summary appended to the paper is as follows:—

"A fatal case of arachnidism in a 29 years old female patient is reported. Local necrosis and hemolysis were the main clinical manifestations. There is the possibility that the arachnid involved was *Loxosceles rufipes*, since 3 adult specimens of this spider were captured at the patient's home. Apparently this would be the first confirmed case of loxoscelism reported in Argentina."

Ravaioli, L., Cantore, G. P. & Bettini, S. Preparazione di un siero immune anti *Latrodectus* per uso umano. [**Preparation of an anti-*Latrodectus* Serum for Human Use**] *Riv. di Parassit.* Rome, 1957, July, v. 18, No. 3, 202–6. [16 refs.]

TOXOPLASMOSIS

Engelbrecht, E. **Toxoplasmosis. A Survey—and a Case of Acquired Pulmonary Toxoplasmosis.** *Acta Tuberculosea Scandinavica.* 1957, v. 34, Nos. 3/4, 163–72, 3 figs. on 3 pls. [35 refs.]

After a survey of congenital and acquired toxoplasmosis, the author reports an acquired case, with a highly positive serological reaction, localized to the lungs in a man, aged 33. The patient responded to treatment with sulphadiazine and mepacrine by clinical improvement and serological fall in the titre."

Jírovec, O., Jíra, J., Fuchs, V. & Peter, K. Studien mit dem Toxoplasmintest. I. Bereitung des Toxoplasmins. Technik des intradermalen Testes. Frequenz der Positivität bei normaler Bevölkerung und bei einigen Krankengruppen. [**Studies with the Toxoplasmin Test. I. Communication**] *Zent. f. Bakt.* I. Abt. Orig. 1957 v. 169, Nos. 1/2, 129–59. [53 refs.]

This paper discusses in great detail the basis of the intradermal test for toxoplasmosis, the preparation of the antigen and the results obtained with it in Czechoslovakia. Positive tests were obtained in 13% of children and up to 30% of adults. The test appears to remain positive throughout life and is unaffected by treatment and the authors regard it as the most valuable means of diagnosing a past infection with toxoplasms. Positive results higher than those in the normal population were obtained where there was arteriosclerosis or endangiitis obliterans uveitis and choroidoretinitis, and also in the mothers of mongols and children with hare lips and cleft palates and in women who habitually aborted. In mentally ill people the positive skin test rate was 42–50% and to obtain these figures no less than 1,400 patients of different ages were tested. The greater frequency of positive toxoplasmin skin tests in these groups needs an explanation and the part, if any, played by toxoplasms in their causation will be the subject of further communications.

I. A. B. Cathie

Piekarski, G., Saathoff, M. & Korte, W. Zum Problem der Spezifität der *Toxoplasma*-Seroreaktionen. Über die Beziehungen zwischen *Toxoplasma*- und *Trichomonas*-Antikörpern. [**The Specificity of the *Toxoplasma* Serological Tests, with Reference to *Toxoplasma* and *Trichomonas* Antibodies**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, No. 3, 356–67. [Numerous refs.]

In considering the specificity of the Sabin-Feldman dye test for toxoplasmosis the authors of this paper report that women with *Trichomonas* infections do not have more frequently positive dye tests for toxoplasmosis than do non-infected women. The dye test for toxoplasmosis therefore, does not appear to be interfered with by *Trichomonas* infection. Complement-fixation tests with toxoplasm and *Trichomonas* antigens showed no cross reactions and were demonstrated by the use of specific antibody-containing sera to be diagnostic. *I. A. B. Cathie*

Meier, H., Holzworth, Jean & Griffiths, R. C. **Toxoplasmosis in the Cat—Fourteen Cases.** *J. Amer. Vet. Med. Ass.* 1957, Nov. 1, v. 131, No. 9, 395–414, 10 figs. [19 refs.]

i. Nakajyo, E. [**Experimental Results on possible Transmission of *Toxoplasma gondii***] *J. Osaka City Med. Center.* 1957, Jan., v. 6, No. 1, 159–75, 8 figs. [55 refs.] [In Japanese.] English summary.

ii. Muramoto, A. [**Observation of *Toxoplasma* inside the Body of Cockroach and a Study of Infection to Mouse by means of Excreted Faeces**] *Ibid.*, 176–91, 15 figs. [14 refs.] [In Japanese.] English summary.

i. Unfortunately, the English summary of this work has suffered so badly during the translation that parts of it have become almost incomprehensible. Firstly, the author has studied the parasitaemia in mice following inoculation [route not stated] of different dilutions of *Toxoplasma* suspensions. Parasitaemia did not occur when only 10 parasites were used, but the blood became infective with 10^2, 10^3 and 10^4 parasites, usually 4 or 5 days before the death of the mice.

The phagocytosis of *Toxoplasma* by mouse leucocytes is discussed: the highest phagocytic activity in mice is stated as being "30 minutes after experiment".

Oral infection by *Toxoplasma* in mice was not found to occur with 4×10^2 or 4×10^3 organisms but it did take place with 4×10^4 to 4×10^6 toxoplasms. It is shown that the higher *p*H values in gastric juices of mice favour the survival of *Toxoplasma*.

With regard to possible arthropod vectors it is stated that "Only 1 case has been successful with 20 Monopsyllus anisus employed as an inoculating suspension an hour after blood-sucking"; "Musca vicina and Lucilia caesar are employed successfully, more favorably in the latter"; and "Xenopsylla cheopis and Culex pipiens pallens infected with T. gondii are unable to transfer the protozoa".

ii. The English summary, again, is difficult to follow. The mode of "infecting" the cockroach and the strain of *Toxoplasma* used are not mentioned.

Toxoplasms were demonstrated [the photomicrographs are quite unconvincing] throughout the intestinal tract of the insect 1–5 hours after their ingestion and were excreted in the faeces 7–10 hours after ingestion. No divisions of the parasite were seen in the cockroach: mice were infected with *Toxoplasma* when inoculated with faeces collected from cockroaches "infected" 10 hours previously. *R. Lainson*.

See also p. 142, Giroud, Observations et données expérimentales concernant les avortements chez l'homme et l'animal (rickettsioses, toxoplasmoses, néorickettsioses ou groupe psittacose). [**Experiments on Human and Animal Abortion in Relation to Rickettsioses, Toxoplasmosis, Neorickettsioses and Diseases of the Psittacosis Group**]

DERMATOLOGY AND FUNGUS DISEASES

Floch, H. Revue critique des investigations et de la littérature mycologiques pour les années 1946–1956 en Guyane Française. [**Critical Review of Investigations and Mycological Literature in French Guiana for 1946–1956**] *Mycopathologia*. The Hague. 1957, Sept. 25, v. 8, No. 3, 194–205. [29 refs.]

Vermeil, C. Mycologie médicale humaine en Tunisie: revue des principales acquisitions, analyses des données concernant les années 1946–56. [**Medical Mycology in Tunisia. Review of Principal Findings and Analysis of Information relating to the Years 1946–56**] *Mycopathologia*. The Hague. 1957, Sept. 25, v. 8, No. 3, 206–15, 1 fig. [31 refs.]

Negroni, P. Desarrollo de los estudios micológicos en la Argentina en el último decenio. [**Account of Mycological Studies in Argentina in the Last Decade**] *Mycopathologia*. The Hague. 1957, Sept. 25, v. 8, No. 3, 216–38, 9 figs. [Numerous refs.]

Watson, K. C. & Lines, G. M. **Brain Abscess due to the Fungus *Hormodendrum*.** *South African Med. J.* 1957, Oct. 26, v. 31, No. 43, 1081–2.

"An example of brain abscess caused by the fungus *Hormodendrum* is described. Fungi of this type are the cause of chromoblastomycosis in man."

Molese, A. & Pane, A. La blastomicosi sud-americana. (Morbo di Lutz-Splendore-Almeida.) [**South American Blastomycosis**] *Acta Med. Italica*. 1957, Sept., v. 12, No. 9, 275–98, 29 figs. [Numerous refs.]

A general review and discussion.

Bakerspigel, A. **The Structure and Mode of Division of the Nuclei in the Yeast Cells and Mycelium of *Blastomyces dermatitidis*.** *Canadian J. Microbiol.* Ottawa. 1957, Oct., v. 3, No. 6, 923–36, 89 figs. on 8 pls. [17 refs.]

TROPICAL OPHTHALMOLOGY

D'Haussy, R. & Rit, J. M. Considérations sur le trachome en Afrique Occidentale Française. [**Trachoma in French West Africa**] *Rev. Internat. du Trachome.* 1957, v. 34, No. 3, 297–310, 1 map. [13 refs.]

The English summary appended to the paper is as follows:—

"Following a general enquiry, it has been established that trachoma is not an uncommon disease in French West Africa."

"This endemic, which is unevenly distributed, attacks 4·33 per cent of the population interviewed.

"The four territories most seriously affected are the Sudan, High Volta, Senegal and Dahomey, where the disease develops and spreads out to other territories.

"This trachoma often seems to end with spontaneous cicatrization.

"Thus the measures taken to counteract trachoma must favour this spontaneous cicatrization."

Malnou. Rôle du trachome dans la cécité du Sud-Tunisien. [**Role of Trachoma as a Cause of Blindness in South Tunisia**] *Rev. Internat. du Trachome.* 1957, v. 34, No. 3, 322–35.

The English summary appended to the paper is as follows:—

"Trachoma is a very important cause of blindness in South Tunisia, directly by its proper corneal complications, or indirectly by the corneal anaesthesia which occurs in about half of the cases, by the lachrymal lesions, by the corneal complications of the associated conjunctivitis, by the trichiasis.

"The sum of these lesions causes 45% of blindness in South Tunisia.

"Moreover, though the fact is not clearly demonstrated, trachoma contributes to the glaucomatous condition which is, in the same area, a very important factor among the remaining causes of blindness (about 35%).

"At last, trachoma aggravates the occasional or surgical injuries of the eye."

Flynn, F. **Trachoma among Natives of the Northern Territory of Australia.** *Med. J. Australia.* 1957, Aug. 24, v. 2, No. 8, 269–77, 6 figs. (5 on pl.) [17 refs.]

This is an interesting and well-informed paper, one of the best on the difficult subject of trachoma which the abstracter has seen for some time. The author's main conclusions are as follows:—

"1. Attention is drawn to the high incidence of trachoma among the natives of the Northern Territory of Australia.

"2. Reference is made to inclusion bodies observed and photomicrographed in smears taken from the Northern Territory natives.

"3. The clinical characteristics of the disease as it occurs among the natives under review are described.

"4. The fact that the disease may progress along two different courses, with the production of the benign or the severe form, is stressed.

"5. Methods of classification are discussed in relation to the clinical features of the disease as it occurs among natives of the Northern Territory.

"6. A clear distinction is drawn between two problems—one dealing with factors that may influence the high incidence, the other treating of conditions determining the severity of the disease.

"7. Poor personal hygiene, along with the very close contact involved in the natives' usual way of life and facilitating spread by direct contact, is offered as an explanation of the high incidence.

"8. A method of estimating by the severity index the relative severity of the disease as it occurs in different districts is suggested.

"9. The factors considered mainly responsible for the severe manifestations of the disease are the following: (*a*) repeated secondary infection; (*b*) climatic conditions of low humidity, wind and heat combined with dust, causing excessive drying of the conjunctiva. Great importance is attached to this type of continued physical trauma as a factor promoting the more severe manifestations of the disease.

"10. Finally, treatment and control of the disease are discussed under three headings: (*a*) the routine course of treatment; (*b*) the planning of mass campaigns; (*c*) the importance of education at all levels in the eradication of the disease."

The paper contains, in addition, a number of interesting references to the more difficult aspects of trachoma. It should be read in full.

D. P. Choyce

Fujiyama, H. **Study of Trachoma Virus (Report 2). Serial Passage of Trachoma Material on the Chorioallantoic Membrane of Fertile Chick Egg and Electron Microscopic Study Thereof (Part 1) On the Pool-K-Strain.** *Rev. Internat. du Trachome.* 1957, v. 34, No. 3, 311–19, 6 figs.

The English summary appended to the paper is as follows:—

"During serial passage of trachoma material of conjunctival tissues on the chorioallantoic membranes of fertile chick eggs, nodular inflammation of the membranes occurred first at the 9th generation.

"2. In the serological tests between the suspension and the serum of trachoma patients in the first stage, positive reaction took place in 71%.

"3. In the electron microscopic study the virus-like particles (60–250 mμ) were separated from the suspension of the nodules on chorio-allantoic membranes of fertile chick eggs."

BIETTI, G. B. & LANZIERI, M. Essais d'emploi d'un produit sulfamidique (Sulfaméthoxypyridazine-Kynex) à élimination retardée pour le traitement du trachome à dosages espacés. [**Use of a Slowly Eliminated Sulphonamide (Sulfamethoxypyridazine) in Spaced Doses in the Treatment of Trachoma**] *Rev. Internat. du Trachome.* 1957, v. 34, No. 3, 270–87, 2 graphs.

The English summary appended to the paper is as follows:—

"The authors have tried the utilization of a sulfonamide compound (the sulfamethoxypyridazine, Kynex, Lederle) characterized by slow elimination, in order to reduce as much as possible the frequency of the administration of the product.

"Clinical investigations have been performed on 57 patients, mostly pupils of school age, showing a II stage trachoma, by administering 8 to 12 ctgs of sulfamethoxypyridazine per Kg of body weight during 3 months. Around 70% of the treated cases were cured at the end of the treatment, but this percentage will probably increase with the passing of time. No side effects were noted and also hematological examinations confirmed the satisfactory tolerance of the product.

"Even if further investigations are required to establish the best dosage regarding economy, practicability, efficacy and tolerance, the obtained results already permit consideration of sulfamethoxypyridazine as a means for the mass treatment of trachoma. The combination of a local interrupted therapy with antibiotics in the countries where an association with seasonal conjunctivitis (mainly due to Koch-Weeks bacillus) occurs, has to be considered, should the treatment with Kynex alone prove insufficient in such cases."

HEAT STROKE AND ALLIED CONDITIONS

MACFARLANE, W. V. **Water and Salt Turnover in Cane-Cutters working on the Coastal Sub-Tropics of Australia.** *Med. J. Australia.* 1957, Aug. 17, v. 2, No. 7, 229–32. [11 refs.]

At Bundaberg, Northern Australia (Lat. 25°S.), the following estimations were made for 4 working days on 10 male cane-cutters, acclimatized to heat and working hard at 92°F. dry bulb and 82°F. wet bulb air temperatures: weight, fluid intake, urine output and constituents.

There was no rise in body temperature. Mean daily fluid intake was

9·16 litres and urine output 1·25 litres. Average weight loss corrected for food and fluid intake, but minus urine, was 2·11 kgm.: this was made up at the evening meal or overnight.

On the average about 14 gm. NaCl were excreted per day in the urine in spite of estimated daily loss of 9 gm. in sweat (concentration 0·1%). The men reported that if they added more salt to the diet they developed oedema of the feet. The mean Na:K ratio in the urine was 2·28.

It is concluded, from comparison with fluid turnovers in other occupations, that cane-cutters perform the hardest work in the coastal belt of Australia.

Of the fluid ingested 19% was taken as tea. The high fluorine content of tea must be remembered, in addition to the large fluid intake, when fluoridation of water supplies is considered.

[The exceedingly high value quoted for radiant heat gain, *viz.*, 600 k.cal./m.²/hr., is not convincing, and may perhaps be due to a typographical error.] *M. L. Thomson*

MISCELLANEOUS DISEASES

Khaira, S. B. & Young, W. B. **Melioidosis.** *Proc. Alumni Ass., Malaya.* 1957, Sept., v. 10, No. 3, 221–3.

A case in a Malay farmer, the fourth seen by the authors, in Kelantan, in the last 18 months.

Bres, P. Réflexions à propos de l'isolement du bacille de Whitmore. [**Observations on the Isolation of** *Pfeifferella whitmori*] *Méd. Trop.* Marseilles. 1957, July–Aug., v. 17, No. 4, 582–95. [29 refs.]

Miletto, G., Collomb, H. & Cardaire, G. L'électro-encéphalographie dans les encéphalopathies en milieu tropical. [**Electro-Encephalography in Encephalopathies in the Tropics**] *Méd. Trop.* Marseilles. 1957, May–June, v. 17, No. 3, 370–98, 20 figs.

The use of recordings obtained by the electro-encephalograph [EEG] has now extended widely beyond its original employment in the diagnosis of epilepsy and cerebral tumours and injuries. Although the EEG is of much value it does not materially help in determining the specific aetiology of infective conditions involving the brain. In Marseilles and in Saigon the authors have made EEG studies of a variety of encephalitic conditions and of encephalopathies, many of them due to tropical

diseases. This paper is a record of these studies on cases of meningo-encephalitis of bacterial, of rickettsial, of virus, of parasitic and of allergic or toxic origin.

The bacterial infections involved include tuberculosis, leprosy, shigellosis and tetanus. The rickettsial embrace exanthematic typhus, scrub typhus, and "African rickettsiosis"; the virus infections include benign recurring endothelio-leucocytic (Mollaret's) meningitis, rabies, type A Von Economo encephalitis, and type B Japanese encephalitis. The parasitic meningo-encephalitides include those of spirochaetal origin such as leptospirosis, syphilis, and spirochaetal relapsing fever; those due to haematozoa, such as malaria; those due to trypanosomiasis and to leishmaniasis; and those due to helminths, including the filarial parasites, cysticerci, schistosomes, and such flukes as *Dicrocoelium lanceolatum* and *Heterophyes heterophyes*. The allergic meningo-encephalitides include post-vaccinial encephalomyelitis and acute rheumatism with associated psychic changes. The toxic meningo-encephalitides embrace those due to the drugs conessine and opium. Data in the form of some detailed records of individual patients and reproductions of their EEG tracings are set out in the text. These should be consulted in the original by those interested.

The authors conclude that in general there is a lack of specificity in the EEG changes seen in most cases of encephalitis encountered in the tropics, and that valuable as this record is it does not clarify the specific causation of this condition. *A. R. D. Adams*

Lemaire, R. & Boura, H. Les troubles du métabolisme de l'eau et des électrolytes chez les sujets transplantés dans les pays tropicaux. [**Water and Electrolyte Metabolism Disturbances in Subjects transplanted to Tropical Countries**] *Bull. et Mém. École Préparatoire Méd. Pharm. de Dakar.* 1956, v. 4, 160–70, 4 figs. [29 refs.]

Walker, D. G. **Elastic Fiber Alterations in Rats treated with *Lathyrus odoratus*. Histopathologic Study of Elastic Cartilage and of Elastic Fibers in Arteries and Membranes, with special reference to the Occurrence of Extra-Aortic Dissecting Aneurysms.** *Arch. Pathology.* 1957, Oct., v. 64, No. 4, 434–45, 28 figs. [23 refs.]

Hamre, C. J. & Yeager, V. L. **Influence of Muscle Section on Exostoses of Lathyric Rats.** *Arch. Pathology.* 1957, Oct., v. 64, No. 4, 426–33, 3 figs. [13 refs.]

PARASITOLOGY: GENERAL

American Society of Parasitologists. **Program and Abstracts of the Thirty-Second Annual Meeting of the American Society of Parasitologists, Philadelphia, Pennsylvania, October 30, 31, November 1, 2, 1957.** *J. Parasitology.* 1957, Oct., v. 43, No. 5, Sect. 2 (Suppl.), 76 pp.

This programme includes 129 abstracts of papers prepared for the meeting. Those of special interest to readers of this *Bulletin* include papers on trypanosomes (7 papers), *Leishmania* (1), avian *Plasmodium* (3), *Toxoplasma* (7), *E. histolytica* (3), schistosomes (14), *Australorbis* (1), plague transmission (1), parasite surveys (2), amoebae (3), *Hymenolepis nana* (3), *Trichinella* (2), *Ascaris lumbricoides* (2), *Enterobius* (2). The Presidential Address, " Some Reflections on the Ecology of Parasitism ", is by Gilbert F. Otto, Abbott Laboratories, Chicago.

H. J. O'D. Burke-Gaffney

Azevedo, M. C. & Maroja, R. C. Inquérito parasitológico entre crianças realizado nos municípios de Ponta de Pedras e Soure-Pará. [**A Parasitological Survey of Schoolchildren in Ponta de Pedras and Soure, Pará, Brazil**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1956, Dec., v. 8, No. 2, 469–78. English summary.

The survey was made in 1951 and related to children aged 7–14 years; it included determination of haemoglobin, spleen and parasite indices, the rates for intestinal parasites and investigation of vectors of disease.

For 1,083 children examined the mean percentage of haemoglobin was 61·8%, and 3·6% had malaria parasites (mainly *P. vivax*); the spleen rate was 6·6%. Faeces from 1,004 children were examined, and hookworm, *Ascaris* and *Trichuris* were found in 80%, 85% and 77%, respectively, the incidence being considerably heavier in Soure than in Ponta de Pedras. *Entamoeba histolytica* was present in 12·1% and *Giardia* in 12·2%, and again the children from Soure were more heavily infected than the others. The most important vector of malaria was *Anopheles albitarsis*; no planorbid snails were found. *Charles Wilcocks*

Deschiens, R. Présentation d'une technique de réaction de fixation du complément avec les antigènes parasitaires de l'Institut Pasteur. [**Technique for the Complement-Fixation Reaction with Parasitic Antigens, used at the Pasteur Institute**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 364–8.

This paper sets out in 4 tables details of 2 techniques for the complement-fixation test for use with parasitic antigens. The second is that used at the Pasteur Institute and found the more satisfactory.

Kačnová-Kratochvílová, Anna, Kutnová, Marta & Petrová, Margita. K otázke pôvodcu intersticiálnej plazmacelulárnej pneumónie dojčiat. II. Vyfarbovanie bunkových štruktúr v bunkách kvasinkovitých mikroorganizmov. [**Contribution to the Problem of the Cause of Interstitial Plasmacellular Pneumonia in Infants. II. Staining of Structures in the Cells of Yeast-Like Micro-Organisms**] *Československ. Hygiena, Mikrobiol., Imunol.* Prague. 1957, v. 6, No. 5, 327–33. 1 chart & 4 figs. on pl.). English summary.

A study has been made of the yeast-like organisms previously isolated from cases of interstitial plasma cell pneumonia [this *Bulletin*, 1955, v. 52, 578]. Sporulation was obtained by growth on agar containing sugar beet leaf and root extract, lemon juice, pressed yeast and glycerol, followed by sub-culture on plaster slopes, or by growth in aerated glucose-peptone medium. The course of spore formation was observed in cultures of *Lipomycoharomyces lactis* under the phase-contrast microscope. Large oval bluish cells with brown centres appeared and gave rise to four spores. In preparations of *L. lactis*, *Candida albicans* and *C. tropicalis* stained with methylene blue and eosin cells containing from 1 to 12 granules were seen, which were considered to be chondriosomes. *D. J. Bauer*

Cameron, **Parasites and Parasitism.**

This book was reviewed in this *Bulletin*, 1957, v. 54, 1481.

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Mouchet, J. Observations sur quelques anophèles exophiles au Cameroun. [**Observations on Some Exophilic Anophelines in the French Cameroons**] *Bull. Soc. Path. Exot.* 1957, May–June, v. 50, No. 3, 378–81. [10 refs.]

These observations were made in 1956 on *Anopheles paludis*, *A. freetownensis* and *A. longipalpis*.

A. paludis females are recorded as biting in the daytime, which is believed to be a new record. *A. freetownensis* was found associated, at least partially, with the porcupine *Hystrix cristata* in the central regions just as *A. smithi rageaui* has already been reported from the south associated with the porcupine *Atherurus africanus* [see this *Bulletin*,

1957, v. 54, 1248]. Also in the central region, *A. longipalpis* was captured at 1,200 to 1,300 metres (3,937 to 4,265 feet) above sea level, in forest galleries sheltered from rain and sun. None of these species was taken in huts though *A. gambiae* and *A. funestus* were common; larvae were not taken at all.

H. S. Leeson

Gonda, O., Traub, A. & Avi-Dor, Y. **The Oxidative Activity of Particulate Fractions from Mosquitoes.** *Biochem. J.* 1957, Nov., v. 67, No. 3, 487–93, 6 figs. [21 refs.]

Gillett, J. D. **Variation in the Time of Release of the Ovarian Development Hormone in *Aëdes aegypti*.** [Correspondence.] *Nature*, 1957, Sept. 28, v. 180, 656–7.

In *Aëdes (Stegomyia) aegypti* the development of the ovaries beyond the resting stage is a two-step process [this *Bulletin*, 1957, v. 54, 627]. While this is initiated within minutes of taking a blood meal, development beyond stage 3 can only take place with the release of a hormone which at 28°C. occurs during a period 8–14 hours later. This critical period varies between individual mosquitoes. Furthermore, work now in progress indicates that it is delayed in insects which have previously fed on fruit.

Daily lots of 24 mosquitoes (Lagos strain), isolated in tubes as "dry" pupae, were divided into two groups. On emergence the first group was fed on raisins for 2 hours. The second group was not fed. Two days later both groups were given a blood meal and kept at 28°C. Mosquitoes from each group were then decapitated every 20 minutes up to 14 hours after the blood meal. On day 4 each group was dissected to see what proportion contained mature oöcytes. It was found that the critical period in mosquitoes fed on fruit occurred mainly between 6 and 12 hours after the blood meal and that for mosquitoes not given fruit between 4 and 8 hours.

The mechanism by which the imbibing of fruit juice might affect the subsequent release of the ovarian developmental hormone is discussed.

R. J. Wood

Bar-Zeev, M. **The Effect of Extreme Temperatures on Different Stages of *Aëdes aegypti* (L.).** *Bull. Entom. Res.* 1957, Sept., v. 48, Pt. 3, 593–9.

Tests have been made to study the effect of extreme temperatures on the eggs, larvae and pupae of *Aëdes aegypti* in water and the eggs and adult females in air at various humidities.

Batches of 100 larvae of each stage were kept at a range of temperatures (0·5°, 4°, 8°, 41°, 43°, 45°C.) for varying periods and then transferred to water at 28°C., where the totals alive and dead were counted

24 hours later. Pupae, classified as "young" (less than half an hour old) and "old" (at least 36 hours old), were treated in a similar way. It was noted that, over the range of the temperatures tested, young pupae were more resistant than both old pupae and larvae.

Adults in groups of 50 were exposed to temperatures between 0·5°C. and 45°C. and humidities between 0% and 100% RH. After exposure they were kept at 60% RH and 28°C. and fed for 24 hours, when mortality was calculated. Above 40°C. and below 0·5°C. humidity ceased to exert any effect on mortality, whereas between these extremes mortality was inversely proportional to humidity.

Eggs in batches of 1,000 were similarly treated. The resistance of the eggs to extreme temperatures was far greater in air than in water. In air at 0·5°C.–28°C. and 0–100% RH the eggs hatched normally.

The order of resistance of the various stages was as follows: eggs, young pupae, larvae and old pupae, and adults. The differences between stages as regards their resistance were much greater at low than at high temperatures.

R. J. Wood

Bonnet, D. D. & Mukaida, T. **A Copepod Predacious on Mosquito Larvae.** *Mosquito News*. 1957, June, v. 17, No. 2, 99–100.

The cannibal mosquito, *Toxorhynchites* (*Megarhinus*) *brevipalpis* from South Africa has been introduced into Hawaii as an aid in the control of the forest mosquito, *Aëdes albopictus*, and a laboratory colony has been established.

Heavy mortality of 1st and 2nd instar larvae hampered the development of the colony and it was believed that this might have been due to improper food. The food taken by the *Toxorhynchites* larvae was studied and various types of microorganisms, including copepods, were provided.

It was then noted that adult copepods in the culture jars were seen to attack the larvae and kill them in rapid succession, by clasping them posterior to the thoracic segment and sucking out the body contents. In a few cases, one or more copepods were observed attacking a single mosquito larva. The copepods seem to hunt the larvae actively and tests showed that a single copepod can destroy 15 to 20 2nd instar mosquito larvae in 24 hours.

The copepod was identified as the cosmopolitan species, *Mesocyclops obsoletus*, which is found principally in fresh ponds. In Hawaii, it has been found commonly in pools, streams and swamps, where it destroys young *Culex fatigans*. It has not been found naturally in tree holes, water-holding plants or other containers in Hawaii. It would thus not be a factor in the biological control of local *Aëdes*, but the authors mention it because of its predacious nature in laboratory cultures of mosquitoes and the need to eliminate it from them.

H. J. O'D. Burke-Gaffney

Fain, A. Notes sur l'acariase des voies respiratoires chez l'homme et les animaux. Description de deux nouveaux acariens chez un lémurien et des rongeurs. [**Acariasis of the Respiratory Tract in Man and Animals. Two New Species in a Lemur and a Rat**] *Ann. Soc. Belge de Méd. Trop.* 1957, Aug. 31, v. 37, No. 4, 469–81. 12 figs.

The English summary appended to the paper is as follows:—

"The author points to the fact that our knowledge of the pathology of Acariasis of the respiratory tract in man is still very scarce. He underlines the difficulty of such a study in man and expresses the view that interesting facts could be gathered by observations of similar cases in animals. He describes two new species of acarina parasitic of the nasal cavities in a lemur-monkey and in rats."

Haddow, A. J. **The Black Mangabey.** Reprinted from *Uganda Wild Life & Sport*. Kampála. 1957, v. 1, No. 2, 4 pp.

[*Cercocebus albigena johnstoni*, a monkey found in Uganda.]

Setzer, H. W. **The Jerboas of Egypt.** *J. Egyptian Pub. Health Ass.* 1957, v. 32, No. 6, 265–71.

MISCELLANEOUS PAPERS

Shamma'a, M. H. **Medical Problems in Lebanon.** *New England J. of Med.* 1957, Aug. 1, v. 257, No. 5, 218–21.

Schofield, F. D. **The Serum Protein Pattern of West Africans in Britain.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, July, v. 51, No. 4, 332–7. [24 refs.]

The serum proteins were estimated in 3 groups, each containing 10 West Africans who were resident in England. Mean values were as follows (all figures gm./100 ml.).

Period of residence	*Albumin*	*Total globulin*	*Gamma globulin*
0–2 years	3·47	4·22	2·20
2–4 years	3·47	3·77	2·04
4–8 years	4·23	3·28	1·60

The pattern in recent arrivals resembles that usually found in Africans in the tropics. Over the course of years this changes and approaches

that found in healthy Europeans. It is concluded that the low levels of albumin and high levels of globulin found in Africans in Africa are not due to genetic factors but to pathological changes which can be reversed if the environment is altered. *R. Passmore*

Prothero, R. M. **Migratory Labour from North-Western Nigeria.** *Africa.* 1957, July, v. 27, No. 3, 251–61. 2 figs [Refs. in footnotes.]

[Migration is common in most parts of Africa, and where it is extensive it obviously may seriously affect the health of the people. The migrants themselves, who are usually young men in search of temporary work and returning eventually to their villages, may acquire diseases while away from home, and may spread them—venereal diseases and tuberculosis are cases in point. Or they may be affected by industrial diseases or malnutrition. Their families, deprived of their support, may be inefficient in their farming, and their land is likely to become overstocked and eroded.]

This paper gives a background picture of migration from the regions of Sokoto, in Northern Nigeria, where the young men leave during the dry season when farming is difficult, to seek food or money, travelling up to 700 miles, often on foot, to cocoa plantations, tin mines, cotton and groundnut areas of Nigeria or (across French territory) to Ghana. An enquiry indicated that in 4½ months of 1952 some 259,000 migrants passed a series of check points, representing between one-quarter and one-third of the labour force of Sokoto Province. The health aspect of this annual movement is only briefly mentioned, but unorganized migration of this kind must be a constant hazard to the whole community, and deserves close medical study. *Charles Wilcocks*

Harris, F. C. & Tettey, C. **Survey of Medical Publications from the Gold Coast (Ghana) 1955–1956.** *West African Med. J.* 1957, Sept., v. 6 (n.s.), No. 3, 117–22. [Numerous refs.]

Trowell, H. C. **The Medical Pioneers and Explorers of East Africa.** *East African Med. J.* 1957, Aug., v. 34, No. 8, 417–30.

This is a brief account of the history of East Africa, especially in the medical field, dealing first with the period of exploration from 1850 to 1900, and then with the subsequent settlement and development. A surprising proportion of the explorers in this region, as well as in other parts of Africa, were medical men possibly because the East African interior was inaccessible and consequently the expeditions had to go in for years and face serious health hazards. Livingstone, Speke and Burton, Emin Pasha and Kirk, all helped to map and open up the

country and to put down the slave trade, and all are briefly reported here. In 1897 Dr. Albert Cook arrived in Uganda to initiate medical development and built at Namirembe the first hospital between Bombay and Lagos. Other hospitals followed such as Rubaga hospital opened by the White Sisters in 1899, Mengo and Mulago hospitals and subsequently many others. This is an interesting but very abbreviated record of the achievement of doctors in East Africa during the early days of European activity there. *T. H. Davey*

Walker, D. A. **Giriama Arrow Poison. A Study in African Pharmacology and Ingenuity.** *Central African J. of Med.* 1957, June, v. 3, No. 6, 226–8, 1 fig.

This poison is prepared by the Giriama tribe of the coastal area of Kenya, and sold by them to the hunting tribes (Walingulu and Wakamba) who use it largely in poaching elephant. It is prepared by boiling the roots and bark of the acokanthera tree, some specimens of which (but not all) apparently contain the active principle. Certain other ingredients are added, including the body of an elephant shrew (which travels in a straight line and which therefore ensures that the poisoned animal will do the same and be easily traced), and the whole is reduced to a thick, pitch-like consistency. The toxic principle is probably ouabain [a glycoside also known as strophanthin-G] which is twice as toxic as strophanthin and is very sensitive to sunlight. Its action is not well understood but is apparently related to the haemoglobin radicle, which is broken down; the blood is darkened, the tissues round the wound appear as if burned, and death takes place in a few minutes. There is no known antidote.

The Africans use it on arrows so designed that the head, bearing the poison behind the barb, penetrates the tissues but the shaft becomes detached on impact, and falls away. These poisoned arrows have been used for homicide.

[For early papers on this chemical investigation of African arrow poisons, see Raymond, this *Bulletin*, 1936, v. 33, 634; 1940, v. 37, 72 *bis*, 679.] *Charles Wilcocks*

REPORTS AND SURVEYS

Bull. Calcutta School Trop. Med. 1957, July, v. 5, No. 3, 99–134, 2 figs. on pl. **Progress of the School during 1947–57.**

This progress report is introduced by Lieut.-Gen. D. N. Chakravarti, Director of Health Services, West Bengal, and the part relating to

research is divided into various sections—Tropical Medicine, Kala Azar Haematology, Bacteriology and Pathology, Helminthology, Dermatology and Medical Mycology, Leprosy, Pharmacology, Chemistry, Biochemistry, Protozoology, Entomology, The Insectarium, and Radiology. Other activities are also mentioned, which include teaching and administration. There is no list of references to published papers, no doubt because such a list would be very long, most of the work recorded has been published and has been abstracted in this *Bulletin*.

It is a notable record. The period immediately after 1947 was inevitably one of confusion, when staff was depleted and frequently changed, and the financial position was unsatisfactory, but as time went on these disabilities were overcome, and research increased. The hospital for tropical diseases, attached to the School, plays an essential part in the research activities, and the photographs of the hospital and the school, reproduced in this report, remind the reader that the buildings were conceived, years ago, on a scale worthy of the city; it may be remembered that the foundation-stone of the school was laid in 1914 and that of the hospital in 1916, and that both owed their inception to Sir Leonard Rogers.

The brief accounts of research which are included in the present report are too numerous for individual mention. They show evidence of careful and painstaking clinical and laboratory investigations, which follow the traditions long established in the Indian Medical Service, and there is no doubt that this scientific approach to complex problems will prove as fruitful in the future as it has in the past. There are no outstanding new discoveries to report, but the mass of valuable detailed work adds refinement to knowledge already acquired. Medical advances of the first importance are rare, and they usually originate in the prepared minds of trained scientists, the requisite intellectual environment exists in Calcutta, and is evidently being encouraged. *Charles Wilcocks*

Nova Lisboa. Relatório das actividades da Missão de Prospecção de Endemias em Angola (1951–1954). [**Report of the Work of the Mission surveying Endemic Diseases of Angola (1951–1954)**.] 62 pp. & 19 folding pp. of maps. 1955.

This is an account of the work of a mission which was sent out to report on the diseases of Angola and which investigated many areas throughout the country from December 1951 to the end of 1954. Various aspects of the work have already been reported, as follows:—yellow fever distribution, this *Bulletin*, 1955, v. 52, 1073; malaria, *ibid.*, 1043; onchocerciasis, *ibid.*, 1126; urinary schistosomiasis, *ibid.*, 1956, v. 53, 1012. A survey in S. Tomé and Principe for yellow fever was reviewed in this *Bulletin*, 1956, v. 53, 308.

The present report sums up this work. The general impression is that yellow fever is of slight importance, though epidemics have occurred in

the past, malaria is widespread, onchocerciasis is also widespread and important, and urinary schistosomiasis fairly prevalent. Results of surveys are set out in detail in tables and maps.

Further work on treponematosis, intestinal bacterial diseases, rickettsial diseases and nutritional deficiencies has been started, and will no doubt be reported later. *Charles Wilcocks*

da Costa, O. R. Inquérito nosológico entre escolares, realizado em 4 municípios da Paraíba e em 3 de Pernambuco. [**A Survey of Disease in Schoolchildren in Parts of Paraíba and Pernambuco**] *Rev. Serviço Especial de Saúde Pública.* Rio de Janeiro. 1956, Dec., v. 8, No. 2, 423–68, 7 maps (1 folding) & 11 figs. [12 refs.] English summary.

This work was done in 1949. The children were 7–14 years old, and the author examined 50% of those in certain towns (to a total of 2,856) and 25% of those in certain rural areas (to a total of 6,522). Blood and faeces were examined and the clinical examination included scrutiny for trachoma, dermatomycosis, scabies, yaws, leishmaniasis, and for Romaña's sign of Chagas's disease. Observations were also made on vectors of malaria and Chagas's disease, and on snails.

Results are set out in detailed tables for each of the 7 localities visited.

The malaria parasite index (1·5%) and the spleen rates were low; the only vector found was *Anopheles aquasalis*, though *A. albitarsis* was also present and might be a vector. The incidence of *Entamoeba histolytica* was also low, though it reached 13·4% in one place. Helminthic infection was universal—hookworm 56—83%, *Ascaris* almost 100%, *Trichuris* varying widely up to 87%, *Schistosoma mansoni* up to 69% (being higher in urban than in rural areas). *Tropicorbis centimetralis* was the snail involved. Trachoma was found in up to about 8%.

The detailed findings are of local interest. *Charles Wilcocks*

BOOK REVIEWS

Macdonald, George [C.M.G., M.D., F.R.C.P.]. **The Epidemiology and Control of Malaria.** pp. xiv + 201 + xl + 11, 17 figs. 1957. New York. Toronto. London: Oxford University Press, Amen House, Warwick Square, E.C.4. [30s.]

No one who has studied the epidemiology of malaria can fail to be impressed by the extreme diversity of the data recorded regarding parasite prevalence, period of transmission, degree of endemicity,

epidemic potential and amenability to control measures in different regions of the world and even in different parts of the same country. These differences involve many separate characteristics and do not seem to be related by any matter of principle; there is clearly something lacking in the picture built up by a combination of circumstantial and biological study, in particular a lack of proportion. Professor Macdonald believes that this can be supplied only by the use of a third type of epidemiology, the mathematical branch. In this he follows the principle enunciated 50 years ago by Ronald Ross: that all epidemiology, concerned as it is with the variation of disease from time to time and from place to place, must be considered mathematically, however many variables are implicated, if it is to be considered scientifically at all.

The author's studies of malarial epidemiology extend as far back as 1925, when he embarked on an intensive investigation of the disease among the schoolchildren of Freetown, Sierra Leone. The findings there recorded, together with the results of further researches carried out subsequently in India, formed the basis of a remarkable paper on the mechanism of infection with malaria in children living in endemic and hyperendemic conditions, published in 1931, which offered an explanation of certain apparent anomalies in the relationship of the parasite with the spleen rate [this *Bulletin*, 1931, v. 28, 995]. In the same year there appeared a second paper dealing with the significance of the various degrees of splenic enlargement in malarious communities. In both these studies a bias towards mathematical treatment of the subject is clearly discernible. This approach has been further developed in the author's more recent writings.

The book under review is based on mathematical studies conducted during the past decade in an attempt to measure the various factors involved in malaria transmission and to relate them one with another. The theories put forward have in the main been supported by the results of actual field surveys. The fundamental papers in which the subject was analysed were published in this *Bulletin*, 1950, v. 47, 907, 915; 1952, v. 49, 569, 813; 1953, v. 50, 871. The object of the book is to describe the epidemiology and control of malaria with the help of the additional light which mathematical epidemiology can throw on them and thereby to integrate biological and circumstantial data into one coherent whole.

The most important components of the epidemiological picture thus built up are: (1) the *basic reproduction rate*, or *potential* number of secondary infections distributed from a single primary case of malaria occurring in a susceptible population; (2) the *actual reproduction rate*, or *actual* number of cases arising as the result of the presence of a single primary case in a susceptible community; (3) the *index of stability*, or mean number of times an anopheline mosquito bites during its expectation of life; (4) the *inoculation rate*, or proportion of a population receiving infective inocula in a given unit of time.

The first 8 chapters of the book are devoted to the quantitative aspects of transmission, equilibrium in malaria, the nature and types of malaria epidemics, local features of malaria in different countries, malaria surveys and their interpretation. The next 4 deal with the theory of control, the use of insecticides, the place of drugs in malaria control and the general conduct of the control programme. There follows an important chapter on malaria eradication and eradication of the vector species of mosquito and finally one dealing with anopheline susceptibility and resistance to insecticides, based on the original research studies now in progress under the author's direction at the Ross Institute.

There are two appendices that require special mention. The first is a mathematical statement listing the symbols used in analysis and describing the methods employed in expressing the various components of the epidemiological picture. The second describes techniques of staining blood smears and recording splenic enlargement, collecting mosquitoes, calculating mosquito survival rates, identifying blood meals, estimating the susceptibility of anophelines to insecticides, detection of resistance and the field testing and chemical examination of insecticides.

The interpretations set out in this book may evoke a certain degree of scepticism in the non-mathematically minded unless it is recognized that some degree of error is freely acknowledged. The author stresses the point that " the assumptions used are not claimed as precise reflections of invariable truth ", but rather as good working generalizations of what is happening, sufficiently accurate to use as bricks in building a workmanlike model which, when compared with natural happenings, resembles them sufficiently to provide an acceptable model. The thread runs first through mosquito longevity, man-biting habit and period of extrinsic cycle to determine the stability of the disease; then through mosquito density and man-biting habit together with the normal reaction of the non-immune to give a basic reproduction rate which determines initial transmission; then through climatic factors which determine the normal season; from these to an inoculation rate, and thence to communal immunity expressed in reduced gametocytaemia and reduced frequency of successful inoculations, and so to the net or locally ruling reproduction rate, in stable areas usually just over its critical level of 1·0 and in unstable ones vacillating partly erratically and partly periodically around it. This, the author states, is the picture of malaria, and the process in reverse is the picture of control.

The subject is presented with the author's customary clarity of expression and in deference to the non-mathematical reader algebraical statements with few exceptions have been excluded from the general text. Representing as it does an entirely novel approach to epidemiological problems, Professor Macdonald's book will arouse wide interest not only among malariologists, but among all who are interested in the study of insect-borne disease. *G. Covell*

HEUSE, Georges A. Biologie du Noir. Matériaux et recherches. [**Biology of the African**] Preface by Eugène SCHREIDER. pp. xviii + 347, illustrated. 1957. Brussels: Problèmes d'Afrique Centrale, 34, rue de Stassart, Belgium.

It is the professed aim of the modern physical anthropologist to establish his subject so firmly that anyone dealing with aboriginal races, whether medical man, agriculturist, veterinary surgeon, forester, labour officer, district commissioner or business man, will have to make himself acquainted with the basic factors of physical anthropology and will derive much advantage from this.

Dr. Heuse has written a pocket-book which conveniently summarizes the physical data known about Africans. The foreword is written by Eugène Schreider of the Laboratory of Physical Anthropology of the School for Higher Studies in Paris. There are chapters on serology, haematology, biochemistry, physiology, neurology, psycho-physiology, ethnobiology and nutrition. It may be not unexpected that in a book written in Paris the data are predominantly collected from French sources. Thus the tables on blood urea, blood sugar, serum calcium levels, etc., summarize the work from French colonies but do not take adequate account of the extensive literature from British West and East Africa. The chapters on technique and organization address themselves more especially to the anthropologist or perhaps the medical man interested in anthropological surveys. They contain a fully worked out plan for an anthropological survey giving methods and advice on documentation, names of learned societies and of specialist journals.

The book is firmly bound and printed on thick glossy paper. There is no doubt that many copies will find their way into the pockets of workers in Africa and to the bookshelves of those who are not in direct contact with the African. *H. Lehmann*

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